FIELDIANA
ANTHROPOLOGY
VOLUME 48

Domestic Multicrafting for Exchange at Prehispanic Ejutla, Oaxaca, Mexico

Gary M. Feinman and Linda M. Nicholas

BAR INTERNATIONAL SERIES 3177 | 2024

BAR PUBLISHING

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Published in 2024 by
BAR Publishing, Oxford, UK

BAR International Series 3177

Fieldiana: Anthropology, 48
Domestic Multicrafting for Exchange at Prehispanic Ejutla, Oaxaca, Mexico

ISBN 978 1 4073 6169 7 paperback
ISBN 978 1 4073 6170 3 e-format

DOI https://doi.org/10.30861/9781407361697

A catalogue record for this book is available from the British Library

COVER IMAGE *Two shell pendants crafted by the occupants of a domestic residence at the Classic period Ejutla site in Oaxaca, Mexico. Credit: Linda M. Nicholas*

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Preface

The study that we conducted in contemporary fields and house lots on the east side of the modern community of Ejutla de Crespo began as an investigation to contextualize an anomalous quantity of marine shell that we had recovered on the surface during the Ejutla Valley Settlement Pattern Project. At the most basic level, that context was straightforward to discover. The shell came from the Pacific Coast and was worked into ornaments during the Classic period in a domestic setting. But, as often happens with research endeavors, the details associated with those answers opened many new questions and investigatory foci, many of which we continue to pursue to the present.

This monograph is a compilation, update, and expansion of previous publications that we have authored on our investigations at the Ejutla site since we began the excavations in 1990. These articles reported on specific aspects of our findings (craft specialization in domestic contexts, ceramic production, shell ornament manufacture, domestic tombs, and pit kilns or firing features), but none of these earlier works covered the full suite of information that is presented here. So, this volume is both a compilation and a synthesis. In our earlier published articles and chapters, we also often were constrained by space, especially in regard to the number of illustrations we could include and the depth of the descriptions that we could provide. Here we cite relevant earlier publications in which we first put forth specific arguments and confirming data. We also provide expanded discussions of the physical and material remains at Ejutla and include many more illustrations. Readers should be aware that a small number of the illustrations include human remains and burial contexts.

In archaeology, a project, such as the one described here, could not be implemented without the heads, hands, and hearts of many contributors. We express our deep gratitude to all of the colleagues, specialists, field crew members, and officials who facilitated this study. We could not have achieved the results we have without their help. Dozens of community members from Ejutla de Crespo assisted in the fieldwork over four seasons. Fausto Olivera Mendoza and Everardo Olivera Díaz from Xaaga, Mitla, Oaxaca, served as vital crew leaders who facilitated the field studies in innumerable ways. We are grateful to Scott Fedick, Christopher Fisher, Andrew Balkansky, William D. Middleton, Jennifer Blitz, J. Michael Elam, Sherman Banker, Linda Gaertner, and Paula Schultz for their efforts in the field and the many contributions they made. Victoria Olivera Díaz was a vital contributor as our cook.

We are deeply thankful for the help and work that we received from illustrators and Field Museum volunteers. Jill Seagard deserves special recognition for everything she did and the exceptional quality of her illustrative work. Lisanne Bartram was an essential volunteer assistant who aided the production of figures and illustrations over the last year. Paula Schulze and Eileen O'Donnell also contributed to the drawings at earlier stages of the study. We also recognize the contributions of Kristin Buskirk, Sara Hornbeck, and Sarah Howard as Field Museum volunteers.

Many colleagues and mentors assisted us, facilitated the project, and were sources of great support. Richard E. Blanton and Stephen A. Kowalewski introduced us to Oaxacan archaeology and gave us a rich foundation for fieldwork in the region for which we are eternally grateful. The senior author's interest in Mexico's Southern Highlands and its rich past was first piqued in undergraduate courses that he took with Kent V. Flannery at the University of Michigan, and Flannery and Joyce Marcus have provided invaluable guidance and support over the many subsequent years. Joaquín García Bárcena, David Carballo, Thomas Charlton, George Cowgill, Manuel Esparza, Ernesto González Licón, David C. Grove, Linda Manzanilla, John Paddock, Jeffrey R. Parsons, T. Douglas Price, Nelly Robles García, María de los Angeles Romero Frizzi, Ronald Spores, and Marcus Winter all provided key elements of advice, encouragement, and assistance over the course of this study and subsequent research.

Of course, the research could not have been conducted without the vital assistance and essential permissions that we received from the Instituto Nacional de Antropología e Historia, the Centro INAH Oaxaca, and the local civil and judicial authorities of Ejutla de Crespo. All of the collections and human remains reported on in this volume are housed in official facilities in Mexico under the auspices of these authorities. Support from the National Science Foundation (BNS 89-19164, BNS 91-05780, SBR-9304258), the National Geographic Society, the Heinz Foundation, the University of Wisconsin, and the Field Museum of Natural History also were critical for the implementation of this investigation.

We also greatly appreciate the comments and advice of three anonymous reviewers and the help and efforts of the entire team at BAR Publishing. Jacqueline Senior and Tansy Branscombe have been especially helpful throughout the publication process.

Abstract

Archaeological investigations at the prehispanic Ejutla site in Oaxaca, Mexico, have had a foundational role in reframing our perspectives on Mesoamerican economies, specifically craft specialization. This volume reports on the excavations of a residential complex located at the southern limits of the valley system, where we recovered evidence for multiple craft activities associated with a single non-elite domestic unit. The residential occupants crafted a variety of ornaments from marine shell, mostly sourced to the Pacific Coast, but few of them were consumed by the householders themselves. In addition, the Ejutla craftworkers produced a range of ceramic utilitarian vessels and figurines, as well as small lapidary objects. Many of the craft goods produced were destined for exchange, circulating in both local and longer-distance networks. These findings have laid a basis for new theorizing on prehispanic economic production and the revision of prior notions that presumed principally local economies, in which specialized production for exchange was centered in nondomestic workshops.

Resumen

Nuestro interés en Ejutla comenzó durante los últimos días del proyecto de patrón de asentamiento del Valle de Oaxaca en 1980, mientras caminábamos por el sendero que formaba el límite sur del área de estudio del proyecto. Este límite era arbitrario, basado en el tiempo y los permisos locales, y los asentamientos no disminuyeron a medida que nos acercábamos a la frontera con el distrito de Ejutla, al sur. A menudo pensábamos en lo que podría haber más al sur y pronto hicimos planes para regresar a Oaxaca y ampliar el estudio para incluir el Valle de Ejutla (Feinman y Nicholas 1990, 2013), pero nunca imaginamos las cantidades anómalas de conchas marinas cortadas, incluidos adornos rotos, que encontraríamos en la superficie en los límites de Ejutla de Crespo, la actual cabecera distrital. Los sitios con acumulaciones masivas de conchas, lugares donde aparentemente se trabajó ese material marino, son extremadamente raros en el Valle de Oaxaca, lejos del mar, y encontrar incluso un trozo de concha en un sitio durante el estudio fue un evento raro. Entonces, en 1990, nos propusimos descubrir por qué había tantas conchas en el sitio prehispánico debajo de la ciudad actual de Ejutla. Aunque para empezar no pudimos fechar la concha superficial en un período de tiempo específico, los taxones mejor representados fueron las variedades de la Costa del Pacífico que generalmente se usaban para ornamentación más que como alimento en la Mesoamérica prehispánica. Esto despertó nuestro interés en la interacción interregional entre Ejutla y el Valle de Oaxaca y entre Ejutla y la Costa del Pacífico.

Con el permiso del Instituto Nacional de Antropología e Historia, el Centro INAH Oaxaca y las autoridades civiles y municipales locales, comenzamos las excavaciones en el sitio de Ejutla con varias preguntas básicas en mente. ¿Cuándo ocurrió el trabajo en la concha marina? La mayor parte de la cerámica rota en la superficie podría pertenecer al período Clásico, pero se mezclaron cerámicas de múltiples períodos (Monte Albán Tardío I – Monte Albán V, 300 a.C. – 1520 d.C.) con restos de la concha y otros artefactos. ¿De dónde se obtuvo la concha? ¿Era toda de la Costa del Pacífico? ¿Cuál fue el contexto socioeconómico de la producción? Habíamos encontrado concentraciones densas de concha marina en la superficie de un área grande en el borde oriental del sitio prehispánico, entonces preguntamos: ¿era este un barrio de hogares cuyos ocupantes elaboraron la concha para convertirla en adornos como Flannery y Marcus (2005, 66; Marcus 1989) argumentaron a favor de San José Mogote en el período Formativo o era algo más? ¿Se llevó a cabo esta actividad en un contexto residencial, como lo indican los escombros superficiales que observamos mezclados con la concha?

Pero la confirmación de la producción de adornos de concha en Ejutla no era todo lo que nos esperaba. Durante las excavaciones recuperamos miles de pedazos de concha cortada y rota, pero pocos adornos completos, de un denso basurero adyacente a una estructura residencial que fue ocupada durante el período Clásico (c. 550–800 d.C.). La mayor parte de la concha procedía de la Costa del Pacífico, a 100 kilómetros al sur de Ejutla, sobre montañas escarpadas. El análisis químico y de microartefactos del piso ayudó a vincular a los residentes de la casa con la producción de adornos de concha, pero había pocos adornos en la casa y solo una pequeña cuenta de concha en la tumba debajo del piso. Dadas las enormes cantidades de restos de concha cortada en el basurero y la rareza de los adornos de concha terminados dentro y cerca de la casa, razonamos que los trabajadores de concha en Ejutla elaboraron grandes volúmenes de adornos para intercambiar y no para su propio consumo.

Los artesanos de Ejutla que transformaban la concha en adornos eran especialistas, en el sentido de que producían para el intercambio o la transferencia económica. Pero se llevaron a cabo su trabajo en un contexto residencial. Claramente, no se dedicaban a tiempo completo a esta actividad y se dedicaban a múltiples artesanías, incluida la producción de cerámica, que últimamente descubrimos y documentamos con un control cronológico más preciso que procedía temporalmente a la fabricación de adornos de concha, al menos en el área que excavamos.

Los artesanos de Ejutla también aplicaron algunas de las mismas técnicas y herramientas para producir objetos lapidarios, un proceso conocido como tecnología de artesanía cruzada (*cross-craft technology*, Shimada 1996, 2007). Alrededor y debajo de la casa excavada había al menos cinco fosas u hornillos llenados de ceniza, y la cantidad de cerámica rota que encontramos durante las excavaciones fue abrumadora, incluidos miles de fragmentos de figurillas de arcilla hechas con moldes, cientos de tiestos con defectos de cocción y moldes para hacer figurillas y otras formas de cerámica. Las figurillas no sólo se hacían para el hogar, sino que también se consumían en otros sitios del Valle de Ejutla (Carpenter y Feinman 1999; Feinman 1999). En resumen, los artesanos de Ejutla produjeron múltiples artesanías para el intercambio a un alto nivel de intensidad situadas en un contexto residencial. La práctica de múltiples actividades de producción artesanal en asociación con unidades domésticas (Feinman 1999; Feinman y Nicholas 2007a) ha sido recientemente reconocida más ampliamente en la Mesoamérica prehispánica, así como en otras economías premodernas (Brumfiel y Nichols 2009; Hirth 2009a, 2009b, 2009c; Shimada 2007).

La nueva evidencia de Ejutla sobre el carácter de la producción y el intercambio en la economía del período Clásico de Oaxaca tuvo ramificaciones revolucionarias en cómo pensamos sobre las economías mesoamericanas e

incluso sobre las economías premodernas en general. Para los artesanos de Ejutla, la economía no era sólo local, ya que se dedicaban a la producción de una variedad de bienes para el intercambio tanto regional como interregional. Elaboraban figurillas y malacates (verticilos de huso) no sólo para su propio consumo, sino que también los comercializaban con otros sitios del Valle de Ejutla. La concha de la Costa del Pacífico llegó a Ejutla a lo largo de rutas de viaje que también se extendieron más al norte hasta el centro de Oaxaca, trayendo concha en bruto y probablemente adornos terminados desde Ejutla a Monte Albán, el consumidor principal de adornos de concha en el Valle de Oaxaca durante el período Clásico. Las rutas de intercambio se extendían hasta México Central, donde la mica de Ejutla llegaba a Teotihuacan. Aunque hay varias fuentes de mica a lo largo del borde occidental del Valle de Oaxaca, incluso cerca de Monte Albán, en un análisis de mica de Teotihuacan y Monte Albán, todas las muestras derivaron de minas en Ejutla (Manzanilla et al. 2017).

Que la especialización artesanal de bienes tanto utilitarios como de prestigio estuviera situada en un contexto habitacional en Ejutla iba en contra de los modelos tradicionales (por ejemplo, Marx 1971) que extrapolaban acríticamente historias recientes de otras regiones globales y suponían que la mayor parte de la producción en contextos mesoamericanos prehispánicos habría sido promulgadas en talleres no domésticos, que luego podrían ser controlados centralmente a través de gobernadores o directores de arriba hacia abajo (Feinman 1999, Feinman y Nicholas 2000, 2012). En lugar de este modelo supuesto pero arraigado, la investigación de Ejutla apuntaló una comprensión más amplia de que los hogares eran una institución mesoamericana clave (Kowalewski y Heredia 2020) que servía como la unidad primaria de producción especializada (por ejemplo, Charlton et al. 1993; Feinman 1999; Hirth 2009b). Este hallazgo obliga por completo a reconsiderar cómo se organizaban y variaban espaciotemporalmente la producción, la distribución y el consumo mesoamericanos prehispánicos, lo que plantea dudas sobre las visiones arraigadas desde hace mucho tiempo de las economías premodernas en general (por ejemplo, Blanton y Feinman 2024; Feinman 2017; Feinman y Garraty 2010; Feinman y Nicholas 2012).

Vinculados a redes económicas y sociales, los hogares mesoamericanos prehispánicos también estaban vinculados a instituciones intermedias, como los barrios, que compartían el trabajo (Carballo et al. 2022). Si cientos o miles de hogares en regiones de la Mesoamérica prehispánica producían bienes para el intercambio, ¿cómo podría esa producción ser administrada o controlada centralmente? La comprensión de que la especialización económica en Mesoamérica se centraba principalmente en las casas también planteó cuestiones fundamentales sobre la distribución y el consumo de productos artesanales. Aunque los mercados a gran escala han sido reconocidos desde hace mucho tiempo por los aztecas, su importancia percibida ha sido minimizada en épocas anteriores (por ejemplo, Cook 1968). Los hallazgos de Ejutla apuntalaron un paso clave para eclipsar la dicotomía falso mercado/no mercado (Wilk 1998, 469) para las economías mesoamericanas prehispánicas y las economías premodernas en general (Feinman 2017; Feinman y Nicholas 2010). Muchos estudios recientes han recopilado múltiples líneas de evidencia para documentar la importancia y diversidad de los mercados mesoamericanos precoloniales (por ejemplo, Feinman y Garraty 2010; Garraty y Stark 2010; Masson y Freidel 2012; Shaw 2012) mucho antes del imperio azteca.

Durante las excavaciones llegamos a respuestas a las preguntas con las que comenzamos, y más, pero aún así salimos con preguntas adicionales que no pudimos responder con base en lo que descubrimos en Ejutla o incluso si hubiéramos continuado en el sitio. Habíamos encontrado producción especializada centrada en casas del período Clásico en Oaxaca, tal como lo fue durante el período Formativo Temprano en la región (Flannery y Winter 1976), y nos dimos cuenta plenamente de la importancia de la arqueología de los hogares. Queríamos excavar más casas. ¿Cómo representativos fueron nuestros hallazgos de una casa en Ejutla? ¿Se centraron otras actividades artesanales en contextos residenciales? El problema que enfrentamos fue que era difícil encontrar casas en el ambiente aluvial de Ejutla. No identificamos definitivamente la casa que excavamos hasta la tercera temporada de excavación. No había evidencia de ella en la superficie. Otras áreas en las afueras de la aldea actual eran inaccesibles. Y las pruebas en un área donde los restos de la superficie eran más visibles revelaron que todos los depósitos habían sido arados hasta alcanzar la roca madre alta, destruyendo por completo cualquier estructura prehispánica u otro elemento que pudiera haber estado allí. Por supuesto, en el momento en que estábamos excavando en Ejutla, las tecnologías geofísicas para detectar elementos debajo de la superficie no eran lo que son hoy (por ejemplo, Conyers 2023).

El objetivo de construir y estudiar una muestra más robusta de casas del período Clásico para Oaxaca nos llevó a buscar otros sitios donde sería posible implementar este diseño de investigación. Durante los estudios regionales se habían mapeado muchos sitios de terrazas en las cimas de colinas, especialmente en el brazo oriental del valle de Tlacolula. Parecían presentar nuestra mejor oportunidad. Se había registrado arquitectura residencial en muchas terrazas de estos sitios, a menudo junto con evidencia de diferentes actividades artesanales. Y muchos de estos sitios no habían sufrido la destrucción posterior al abandono causada por el arado y las construcciones más recientes que han impactado muchos sitios en ubicaciones más accesibles en áreas aluviales. ¿Encontraríamos producción especializada en ámbitos domésticos? ¿Esta producción sería para consumo local, para intercambio o para ambos, como en Ejutla? Los dos sitios en la cima de una colina que elegimos para excavar son El Palmillo y la Fortaleza de Mitla, donde excavamos un total de 11 casas, todas del período Clásico. Por otras razones, se nos dio la oportunidad de excavar un tercer sitio en Tlacolula, Lambityeco, que ha estado en la literatura desde las excavaciones de John Paddock allí en la década de 1960 (por ejemplo, Lind y Urcid 2010). Lambityeco está ubicado en terreno aluvial en el centro de Tlacolula, en un ambiente más similar a Ejutla que a los sitios en las cimas de las colinas, pero debido a que es parte de una zona arqueológica, estaba más protegida, y excavamos una casa y varias otras estructuras en el área cívico-ceremonial del sitio. Nuestras excavaciones en estos otros sitios ampliaron nuestro conocimiento sobre la economía del período Clásico de Oaxaca y, lo que es más importante, proporcionaron datos para documentar la variación tanto de la región como del sitio en el tiempo en que el sistema político de Monte Albán estaba en su apogeo. Actualmente, planeamos volúmenes futuros que incluyan excavaciones en los tres sitios. Aunque nuestro objetivo es seguir centrando estos volúmenes en la producción y el intercambio, también examinaremos otras relaciones sociales y económicas entre los hogares, así como la participación de los residentes de hogar en redes económicas y políticas más amplias.

En resumen, es importante no perder de vista lo que aprendimos de las excavaciones de Ejutla. Descubrimos que la producción especializada para el intercambio en Oaxaca se llevaba a cabo en entornos domésticos, que los bienes producidos se distribuían más allá de la casa y el sitio, y que estos hallazgos tienen implicaciones para nuestra perspectiva sobre la economía del período Clásico en Oaxaca. Aprendimos la importancia de las interacciones a macroescala y el movimiento interregional de bienes. Durante el período Clásico, Ejutla estuvo estrechamente conectada con el resto del Valle de Oaxaca y la Costa del Pacífico, trasladando concha marina y obsidiana desde el oeste de México a los valles centrales e intercambiando mica hasta Teotihuacan en México Central. Y quizás lo más significativo es que aprendimos la importancia de estudiar las casas, ya que esta escala más pequeña abre lentes de variación para tiempos y espacios determinados. La variación de los hogares y las diversas conexiones socioeconómicas entre estas unidades domésticas dejan claramente claro que el pasado no fue homogéneo, estático ni determinado por las élites. Incluso aquellos con recursos modestos, a menudo excluidos de las historias escritas y documentales, desempeñaron papeles necesarios y tienen lecciones clave que contar.

1

Introduction to the Volume

On the 16th day of June 1984, our field crew stepped out of our rented living quarters in Ejutla de Crespo to begin a systematic, regional survey of the Ejutla Valley. We walked toward the eastern edge of the town, a community of around 8,000–10,000 people at that time. The fields at the edge of Ejutla seemed like a reasonable place to start on the first day of a multi-month archaeological survey, as a key aim on day one was training the crew on our survey methods, and the proximity to town meant that no one had to be concerned about the location, nor was much time needed for travel.

Walking in town, we immediately began to find prehispanic potsherds and broken obsidian blades on the surface of the unpaved streets. In addition, pottery that clearly was not modern often was visible in exposed adobe bricks used in the construction of contemporary house walls. As we approached the fields at the edge of town, we observed an unusual artifact on the ground, a small piece of marine shell. Unlike the rest of our team, we had considerable prior experience as crew members on archaeological surveys in the Valley of Oaxaca to the north of the Ejutla Valley (Blanton et al. 1982; Kowalewski et al. 1989). These regional archaeological surveys were an outgrowth of Kent Flannery's multiscalar project, The Prehistory and Human Ecology of the Valley of Oaxaca (Flannery 1976a). To us, shell was a rare surface find. Ejutla is, after all, ensconced in Mexico's Southern Highlands, more than 100 km from the Pacific Coast (Figure 1.1).

We reached the fields at the eastern edge of town, unaware of what awaited us. The first plowed fields we entered were littered with broken pottery and obsidian blades, but it was the dense scatters of surface shell debris that focused our attention. In one small collection area (~0.1 ha) we picked up more than 300 pieces of shell (Figure 1.2). This was unprecedented, as we almost never found shell, especially in quantity, during our many months participating in the regional surveys of the larger Valley of Oaxaca in 1977 and 1980 (Blanton et al. 1982; Kowalewski et al. 1989).

Most of the shell we found in these fields was cut debris, ranging from fragments of large gastropods to small pieces of nacreous mother of pearl, and, even to our untrained eyes, clearly was not food waste. Some chunks appeared to be broken, unfinished ornaments or blanks. Only a few pieces were finished or polished, mostly small thin disks. There also were a few small, complete shells. Mixed with the shell were unusual quantities of broken, heavily used obsidian blades (Figure 1.3). We surmised that these tools may have been used to cut the shell. We also observed ceramic wasters and stone debris that was indicative of lapidary activities. The utilitarian ceramics, grinding stone fragments, and concentrations of building stones in these same fields appeared to be domestic refuse, which raised the possibility that the shell-related and other craft activities that we suspected were enacted in this setting may have been situated in a residential context. That prospect was a bit curious at the time since most prehispanic and other premodern production activities, especially for exchange, were presumed to have taken place in nondomestic workshops (e.g., van der Leeuw 1976, 1977).

Over the next several years we remained intrigued by our findings on the east side of Ejutla and returned in 1990 to address the many questions that were raised by the observations and discoveries that we had made there six years earlier. What was the socioeconomic context of the shell working, when were these activities enacted, what kinds of ornaments were crafted, and for whom? What about the less obvious indicators of ceramic production and stone crafting? In the remainder of this volume, we report on the excavations that we led in the area of dense surface shell. We document what we recovered during five seasons of field and laboratory work, what we learned from those investigations concerning shell ornament production and other prehispanic craft activities, and the broader implications of this research for prehispanic Mesoamerican economies and interregional interrelations more generally.

1.1. What Brought Us to Ejutla

That first day in the fields on the east side of Ejutla de Crespo was the beginning of a regional-scale project that we directed over two summers in 1984 and 1985 (Feinman and Nicholas 1990, 2013). The impetus to survey the Ejutla Valley began soon after the regional survey of the Valley of Oaxaca was completed in 1980 (see Figure 1.1). The two of us were part of the field crew that surveyed the southern part of the valley during the 1980 field season. The southern boundary of the Valley of Oaxaca survey area was determined as much by local permissions and time as by the low hills that separated the Valley of Oaxaca from the smaller alluvial basin to the south. Settlement did not drop off as we neared the boundary with the modern political district of Ejutla, and we often thought about what might lie farther south. At that time, less was known about prehispanic Ejutla than about the larger Valley of Oaxaca to the north.

Although the Valley of Oaxaca has long been recognized as a core region of prehispanic Mesoamerica (Palerm and Wolf 1957), regional vantages are not entirely adequate

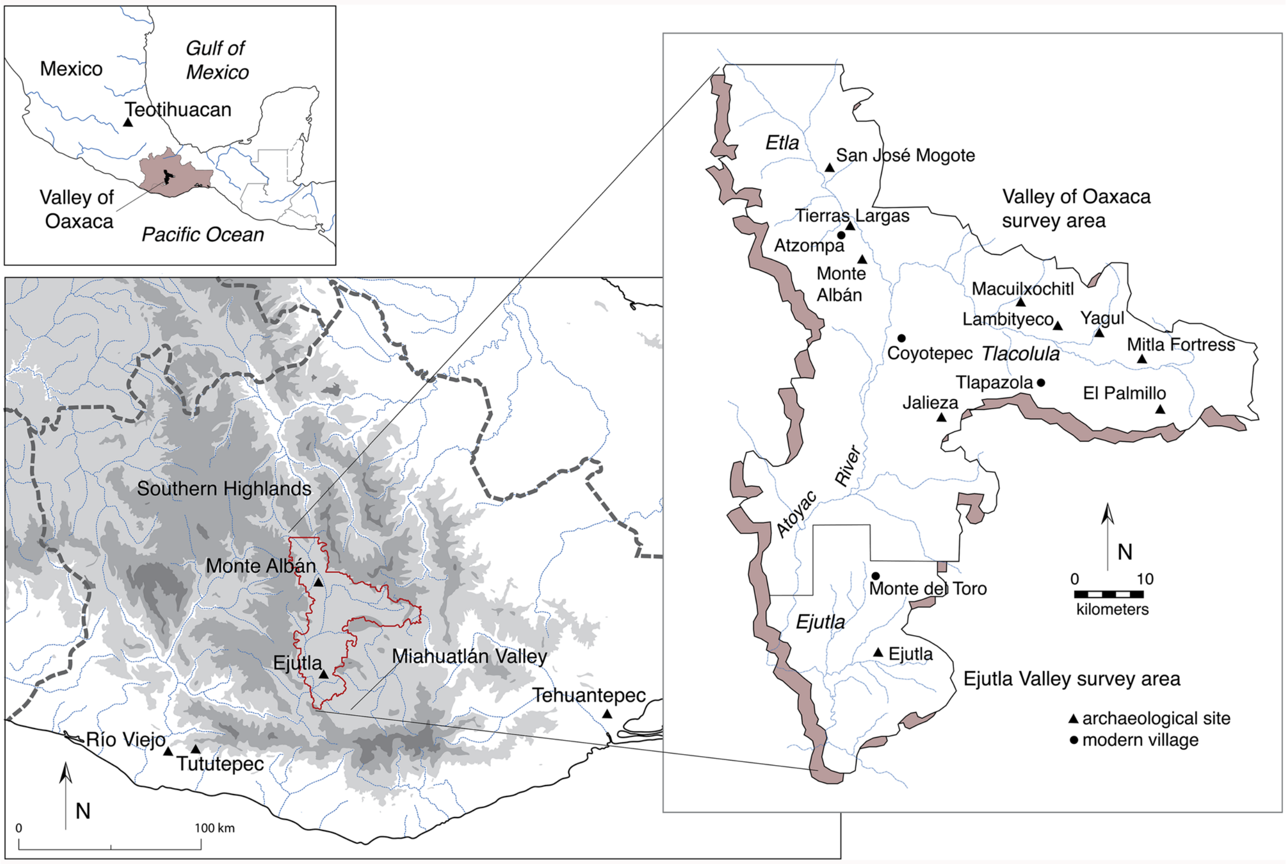

Figure 1.1. Map of Mexico's Southern Highlands and the Valleys of Oaxaca and Ejutla, showing places mentioned in the text.

Figure 1.2. Shell from one small collection area (CAE) on the east side of Ejutla de Crespo.

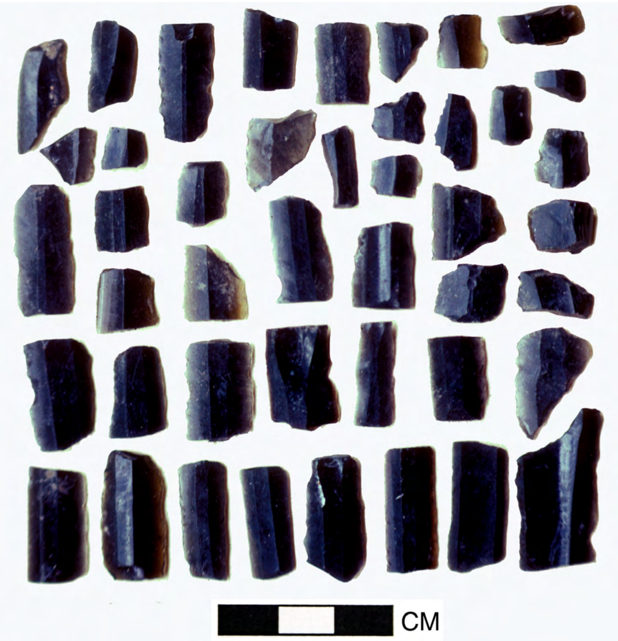

Figure 1.3. Obsidian from the same collection area (CAE) on the east side of Ejutla de Crespo.

to assess the limits of prehispanic polities or certainly the exchange links that extend beyond those boundaries (Kowalewski 2004). Political borders are not always coterminous with geographic regions (sensu Haggett 1966, 242–47) or with economic and cultural networks (e.g., Blanton and Feinman 1984; M. L. Smith 2012). One of our goals in expanding the systematic archaeological survey into Ejutla was to provide a broader macroregional perspective on the Central Valleys of Oaxaca, of which these two neighboring valleys were a part. What was the relationship between the Valley of Oaxaca and its smaller, southern neighbor? Did that relationship shift over time, and in what ways?

The results of the regional investigation of Ejutla (Feinman and Nicholas 1992, 2013) raised a series of additional questions that prompted our investigatory transition from survey to excavation. One of the joys of archaeological survey is finding the unexpected. The area of dense worked shell debris mixed with prehispanic ceramics and stone tools was one such unexpected discovery. But to address the questions that this evidence of prehispanic shell working in the landlocked Ejutla Valley brought to mind would require more fine-grained temporal and contextual information than survey could yield. Given the rarity of prehispanic shell working in highland Oaxaca, gaining a deeper understanding of this craft activity at Ejutla and why prehispanic Ejutleños crafted shell ornaments would be integral for examining interregional relations in the Central Valleys of Oaxaca.

1.2. Research Themes and Questions

Our discovery of shell-working debris in fields on the east side of Ejutla de Crespo, most likely in a residential context, dovetailed with larger issues about interhousehold and intercommunity economic relations in prehispanic Mesoamerica that were starting to come to the fore. The earliest excavations in Oaxaca were carried out at the prehispanic urban capital, Monte Albán, with a focus on dating and monumental architecture (e.g., Caso et al. 1967). When Kent Flannery and Joyce Marcus (2005, 2015) began their excavations in 1966 at the earlier, Formative village at San José Mogote, in the valley's Etla arm, north of Monte Albán, they placed great importance on looking at meaningful units to get at the social context of different activities. That research goal did not align well with the then-standard practice of excavating test pits and trenches. Instead, they (Flannery 1976a) made the residence the unit of analysis and excavated broad horizontal expanses to get at houses and their associated exterior spaces. Their illustration of the importance of domestic units for understanding a wider set of issues beyond building chronologies led to a broadening of themes that archaeologists in Oaxaca began to address. As results of the San José Mogote excavations were being published (e.g., Flannery 1976a), the focus of work in Oaxaca expanded from Monte Albán to the central valley and areas beyond. As we began excavations in Ejutla, we took inspiration from Flannery and Marcus's residential excavations at San José Mogote as a template to expand the corpus of excavated houses to other periods and to answer questions about the nature of interregional interaction, economic specialization, and the prehispanic economy.

When we began excavations in Ejutla in 1990, Flannery and his students and colleagues had amassed a significant sample of excavated houses for the Formative period even beyond San José Mogote (Drennan 1976; Whalen 1981; Winter 1972), but there had been few excavations in Classic period domestic contexts beyond several residential terraces at Monte Albán (Winter 1974). A larger sample of domestic units for the Classic period Valley of Oaxaca was necessary to understand how similar or different the later domestic units were from those in the Formative period. We were also interested in the diversity and interrelationships between households during the Classic period. Our goal was to begin to build a sample of excavated Classic period houses, and the surface hints of shell ornament production in a residential context in Ejutla provided a potential venue for implementing that aim.

One of our first questions was the timing of the shell working at Ejutla. Was it even prehispanic, as we suspected, given the ancient pottery and stone tools we found in association with the shell? The best-represented shell taxa on the surface were Pacific Coast varieties that generally were used for ornamentation rather than for food in prehispanic Mesoamerica, so we did not think the shell was modern. Although most of the broken pottery in the area of dense surface shell could pertain to the Classic period, ceramics from multiple periods (Monte Albán Late I–Monte Albán V, 300 BCE–1520 CE) were mixed with the shell debris and other artifacts, so excavation would be necessary to confirm whether or not the shell working mostly pertained to the Classic period.

Another question was the socioeconomic context of the shell working at Ejutla. Flannery and his colleagues found evidence of shell working in some Early Formative residential contexts, typically small concentrations of flint chips, chert tools and drills, and fragments of cut and discarded shell in the corner of a house (Flannery and Winter 1976, 39). But not all houses engaged in the same activities, and shell working and other specialized crafts tended to be centered in one community ward or another (Flannery and Marcus 2005, 66; Marcus 1989). Was the area of shell debris at Ejutla also a ward of households whose occupants crafted shell into ornaments? Was shell working (and potentially other craft activities) at Ejutla carried out in residential contexts, as indicated by the surface debris?

A third set of questions revolved around the nature of production, distribution, and the prehispanic economy. What was the nature of the technology that was used to craft shell ornaments at Ejutla? What tools were used to cut the shell and shape the ornaments? What ornaments were made, a small set of similar items, like the small disks we found on the surface during the regional survey, or a broad diversity? Was there a division of labor or different tasks carried out by separate households? What about procurement? The first worked shells that we identified in the surface debris were Pacific Coast varieties. Ejutla is considerably closer to the Pacific Coast than the Gulf Coast, so that was not unexpected. But would more investigation and analysis reveal a broader shell assemblage that also included Gulf Coast species? In Early Formative residential contexts at San José Mogote, far to the north, one of the most common categories of shell came from rivers of the Gulf Coast (Flannery and Marcus 2005, 79).

What was the scale and intensity of shell working at Ejutla? Did the crafters of shell ornaments work their trade on a part-time or full-time basis? For whom were the shell ornaments crafted? Were they intended only for local use or for broader distribution to other communities near and far? In the surface collections, there were few finished shell ornaments amid the much greater quantities of broken, unfinished ornaments and cut shell debris. But would we find more finished items in intact contexts such as house floors, burials, and offerings? Or would the shell species, debris, and unfinished ornaments at Ejutla provide clues that the site was a possible or likely source for some of the finished ornaments found at other contemporaneous sites in the valley, including Monte Albán, the regional capital? The intensity and context of shell ornament production at Ejutla, and whether or not households engaged in more than one craft activity, as seemed possible based on surface debris, has implications for how we think about the prehispanic economy.

What about macroscale relations across the region? On the regional surveys we had noted much more evidence of utilitarian craft production (ceramics and lithics) in the Valley of Oaxaca than in Ejutla (Feinman and Nicholas 1992, 2013; Kowalewski et al. 1989). We did find many good clay deposits in the Ejutla Valley, so we suspected that ceramic manufacture there might have been of smaller scale (intended for local use) or shorter duration than in the Valley of Oaxaca, making it less visible on the surface. The shell was different. Shell working was much rarer in the region overall, but heavily concentrated in Ejutla. In the much larger Valley of Oaxaca, evidence of shell working has been found only at San José Mogote during the Early Formative (Flannery and Marcus 2005; Flannery and Winter 1976, 39–41; Marcus 1989) and for later epochs in surface collections on a few residential terraces at Monte Albán (Blanton 1978). In the Miahuatlán Valley, immediately south of Ejutla and closer to the Pacific Coast, evidence of prehispanic shell working has been reported (but not described in detail) in one small habitation area that is part of a large site near the district capital (Brockington 1973, 15; Markman 1981, 32). But the densest surface evidence of shell working was at the Ejutla site. We suspected that excavations in the fields of dense surface shell at Ejutla could provide a wealth of information, not only on details of shell ornament production but also to help us answer broader questions about macroscale relations and the nature of the prehispanic economy.

1.3. Organization of the Book

We organize this volume into a series of chapters that present background information on Ejutla, the basic findings of the excavations, our principal research themes, and the material record. In chapter 2, we discuss a range of topics relevant to our excavations in the area of dense surface shell, from a fuller picture of the Ejutla Valley drawn from the regional survey, a description of the Ejutla site beyond the shell area, a brief introduction to shell in prehispanic Mesoamerica in which to situate the surface findings at the Ejutla site, and the importance of excavating houses in Mesoamerica. We briefly introduce three other sites in the Valley of Oaxaca—El Palmillo, the Mitla Fortress, Lambityeco—where we subsequently excavated houses and on which we draw when relevant to findings from Ejutla. Chapter 3 lays out our three-stage investigatory plan of surface collection, test pits, and large-scale horizontal exposures to recover information on the timing, context, scale, and nature of shell ornament production and other craft activities at Ejutla. In chapter 4 we describe the architecture and other physical evidence we uncovered, including the prehispanic structure, the subterranean tomb, the firing pits near the structure, and the temporally diagnostic ceramics associated with the different features and levels of the excavations. Subsequent ^{14}C assays place the shell working in the Middle–Late Classic (550–800 CE) (Table 1.1). In chapter 5 we focus on the features and artifact assemblages that reveal the domestic context of the excavated structure, including the subfloor tomb and its contents, the kitchen area and interior workspace, and the range of utilitarian artifacts and subsistence remains that are typical of residential

Table 1.1. Chronological sequence for the Valley of Oaxaca.

Dates	Mesoamerican period	Oaxaca (c. 1970–1990s)*	Revised chronology**
1500			
	Late Postclassic		Monte Albán Late V
1300			
		Monte Albán V	
1100	Early Postclassic		Monte Albán Early V
900			
		Monte Albán IV	Late Monte Albán IIIB-IV
700	Late Classic		
		Monte Albán IIIB	Early Monte Albán IIIB-IV
500			
	Early Classic	Monte Albán IIIA	Monte Albán IIIA
300			
100 CE	Terminal Formative	Monte Albán II	Monte Albán II
100 BCE			
		Monte Albán Late I	Monte Albán Late I
300	Late Formative		
		Monte Albán Early I	Monte Albán Early I
500			
		Rosario	Rosario
700	Middle Formative		
		Guadalupe	Guadalupe
900			
		San José	San José
1100	Early Formative		
1300		Tierras Largas	Tierras Largas
1500			

* Chronology used during the regional surveys of the Oaxaca and Ejutla Valleys

** Revised chronology for the Classic and Postclassic based on excavations and radiocarbon assays

contexts in Oaxaca and were present in the middens and the pit kilns. We make comparisons as relevant to El Palmillo, the Mitla Fortress, and Lambityeco. The mixing of utilitarian debris with artifactual evidence for ceramic production, shell working, and lapidary crafts connect these specialized activities to the members of a single household.

As we gathered information that answered our initial set of queries, other findings were unexpected and raised additional questions; for example, the evidence of multicrafting and high-intensity production for exchange in a domestic context did not fit extant models of prehispanic craft specialization, which has implications for how we view the prehispanic economy. In chapter 6, we discuss those extant models and how the evidence for domestic specialization and multicrafting at Ejutla provoked us to revisit the workings of the Classic period economy. The following chapters focus on the evidence for specialized production at Ejutla.

We present the evidence for ceramic production in chapter 7. The contents of the pit kilns indicate that they were used to fire a range of vessel forms. The ancient potters crafted both utilitarian vessels mostly for local use and also a range of figurines for broader exchange. The chapter includes an extensive presentation of the figurine assemblage. The subject of chapter 8 is shell. We begin with background on shell ornaments in Mesoamerica before presenting the Ejutla shell assemblage of more than 24,000 pieces. Most of the shell are small cut fragments and debris from Pacific Coast species. A small subset comprises ornaments in a variety of states, from blanks to partially crafted to finished adornments. We describe the range of ornaments and the technology and tools used to work the shell, including obsidian blades, chert microdrills, and tubular cane drills and string used with an abrasive such as sand. We subsequently sourced obsidian from our excavations at all four sites. The contrast in obsidian at Ejutla and the other three sites sheds light on possible routes of exchange and the movement of marine shell to the Ejutleño artisans. In the course of our investigations, we were invited to analyze shell objects recovered during excavations at Monte Albán directed by Marcus Winter and by Ernesto González Licón; here we make comparisons to the Ejutla assemblage, which raises the possibility that some of the items crafted in Ejutla made their way to Monte Albán.

In chapter 9, we describe other craft activities at Ejutla. Two abundant classes of stone tools—obsidian blades and chert microdrills—were used to work the shell. The obsidian blades were imported, while the chert was local, with the microdrills made on site. Other stones appear to be work surfaces used in crafting the shell ornaments. The stone materials at Ejutla also include evidence of lapidary activities, notably the application of the same tubular drill technology that was used to make shell disks. A comparison of stone materials at Ejutla to those of the other sites we excavated highlights the rarity of the Ejutla assemblage and its association with shell working and lapidary activities. Although in lower quantities, bone tools and other worked, decorative pieces, including a high quantity of loose dog canines, were mixed in with shell debris.

We return to the key themes of the book in chapter 10. In this concluding chapter, we briefly discuss what we see as key findings of this study. What are the implications of shell working for Ejutla's interregional relations with the rest of the valley? What inferences follow from the evidence of household production for exchange and the importance of multicrafting for the prehispanic economy? We conclude by discussing questions that were raised in the course of the Ejutla research and foreshadow how these queries served to shape subsequent investigations that we implemented in Oaxaca. The results from those studies have been the backbone of our recent publications on craft specialization, settlement organization, governance, Classic–Postclassic chronology, and ritual activities; they also ground what we plan to be a suite of volumes to follow this work.

2

Background to the Ejutla Site

The Ejutla Valley is a small alluvial basin at the southern edge of the much larger Valley of Oaxaca (see Figure 1.1). Together they are the core of Mexico's Southern Highlands. While high mountain ridges largely define the edges of these valleys, the physiographic divide between them is so gradual that one traveling the main highway is hardly aware of passing from one (Oaxaca) to the other (Ejutla), and throughout most of the prehispanic era, Ejutla was part of the political, cultural, and economic networks that centered on the Valley of Oaxaca. Population densities were never as high and individual sites were never as large in Ejutla. Nevertheless, the relationship between the two valleys was not static (Feinman and Nicholas 1990, 1992, 2013, 181–82). When Ejutla was first settled during the Early–Middle Formative period, it was a nearly vacant frontier with only a few small settlements. The population grew and site hierarchies developed in Ejutla as Monte Albán was established (ca. 500 BCE) in the center of the Valley of Oaxaca and expanded its hegemony over the subsequent centuries, but it was not until the Classic period (ca. 250–900 CE) that large population centers (>1000) were established in the Ejutla Valley and the region was more tightly interconnected to the Valley of Oaxaca (see Table 1.1). By the Late Postclassic period, after Monte Albán's decline as the regional capital, a series of small, economically interdependent polities in Ejutla may have increased their ties to coastal areas outside the Central Valleys of Oaxaca.

The fuller incorporation of Ejutla into Monte Albán's political sphere during the Classic period appears to have had economic ramifications. The Ejutla Valley has fewer large expanses of good farmland and receives less rainfall than parts of the Valley of the Oaxaca, so exchanging surplus crops to communities in the larger valley was not the draw. Instead, Ejutla is positioned geographically closer to the coast and is a crossroads for natural transportation routes that enter the valley system from the east and south (White and Barber 2012), serving as a conduit for coastal and lowland products from farther south, including marine shell and cotton. Surface shell was recorded at a much higher proportion of sites (six to seven times as many) in Ejutla than in the Valley of Oaxaca (Feinman and Nicholas 1990, 1992, 85, figure 7), with most of the shell observed at sites near the Ejutla River, its tributaries, or along the Atoyac River between its confluence with the Ejutla River and its exit point from the central valleys, at the southwestern edge of the Ejutla Valley (Feinman and Nicholas 2013, 116–17). These sites largely track the movement of Pacific Coast shell into Ejutla, but only at the Ejutla site did we find clear evidence of shell ornament production.

Spindle whorls were not frequently observed during surface survey in either valley, yet we noted twice as many in Ejutla (Feinman and Nicholas 1992, 88, figure 8), most of which are small, simple whorls that fit into Mary Parsons's (1972; see also Carpenter et al. 2012) category of whorls that were used for spinning cotton. Postclassic ethnohistoric accounts relate that cotton largely was traded from lowland coastal areas, such as Tututepec and Tehuantepec, south of the central valleys, to highland towns where it was woven into finished textiles (Ball and Brockington 1978). In addition, Ejutla is lower in elevation than the Valley of Oaxaca, and there are small patches of good flat land with high water table along the Atoyac River in southern Ejutla where it would have been possible to grow cotton (Feinman and Nicholas 2013, 118; see also Saindon 1977). Whether or not cotton was grown in Ejutla in prehispanic times, this resource, like shell, most likely traveled routes through Ejutla to reach communities farther north.

2.1. The Ejutla Site

The prehispanic community at Ejutla de Crespo was initially settled in Monte Albán Early I (ca. 500–300 BCE) on a low spur on the north side of the Ejutla River overlooking the broadest stretch of alluvium in the Ejutla Valley (Figure 2.1, Figure 2.2). The continuously occupied settlement was one of the largest sites in the Ejutla Valley throughout the prehispanic era, growing to more than 1800 inhabitants in the Classic and Postclassic periods (Feinman and Nicholas 2013, 107, 165), when the limits of the site expanded beyond the bounds of the modern community (covering ~1 km^2). The site was recorded during mid-twentieth-century visits and reconnaissance by archaeologists of Mexico's Instituto Nacional de Antropología e Historia, who reported several tall mounds in town (Feinman and Nicholas 2013, 20–23), and a cruciform tomb, likely Postclassic, was reported in the center of town early in the twentieth century (Diguet 1905). Although no evidence of this tomb existed at the time of the regional survey, we documented at least 12 mounds, several still standing 8–12 m tall (Figure 2.3) (Feinman and Nicholas 2013, 290). Fragments of carved stones were visible in the outer foundation walls of several houses in town. The largest one portrayed an individual with arms crossed on the chest (Figure 2.4), a posture thought to signify revered ancestors (Marcus 2002, 119), similar to several carved stones from Río Viejo (Monuments 7–9) and other sites on the Pacific Coast of Oaxaca (Joyce et al. 2001, 352; Urcid 1993, figure 18; Urcid and Joyce 2001, 203–04, 207; Zeitlin 1993).

Figure 2.1. View of Ejutla de Crespo in the center of the Ejutla Valley (photograph taken in 1985 during the regional survey).

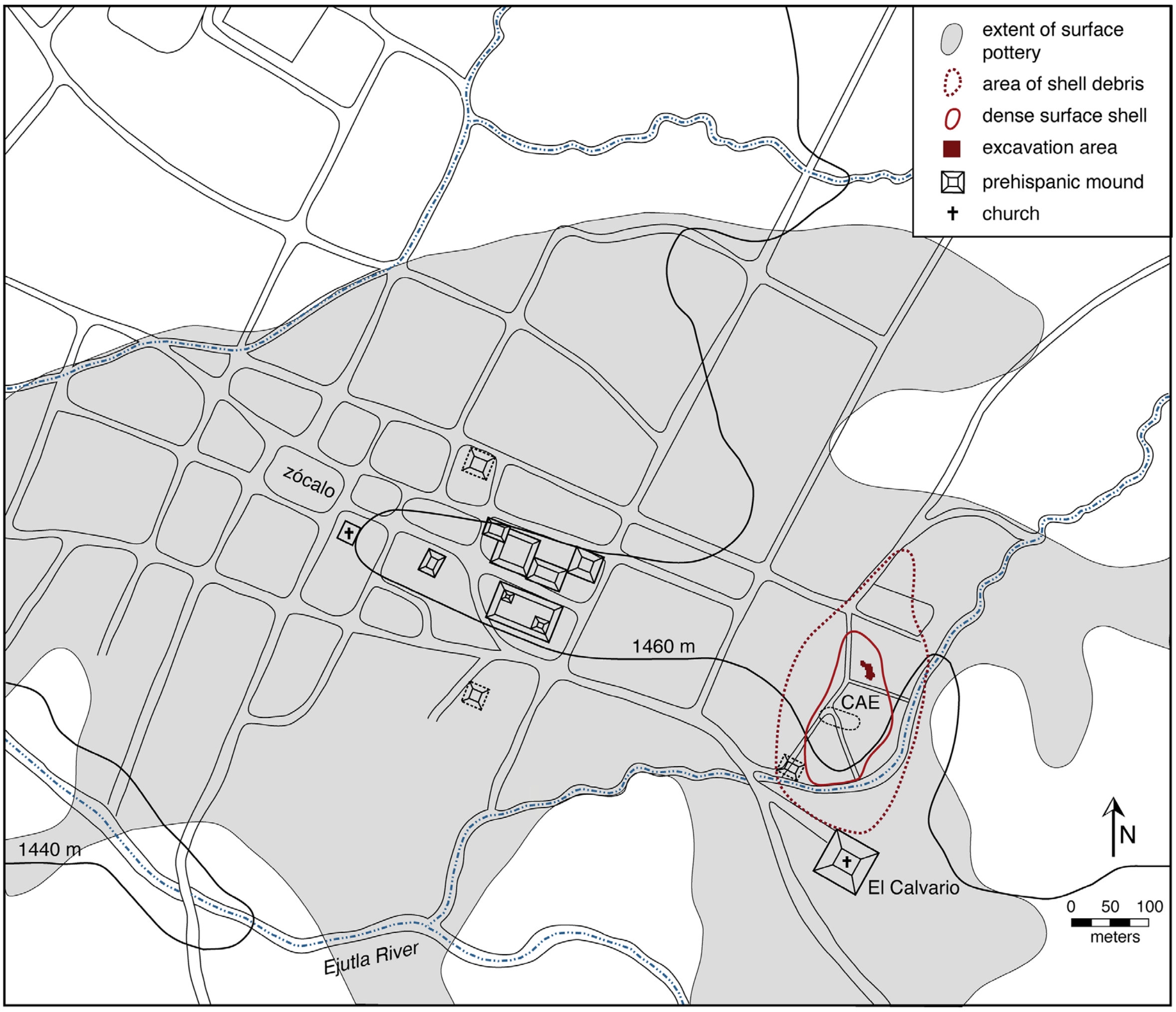

Figure 2.2. Map of Ejutla de Crespo showing the extent of the archaeological site, the prehispanic mounds, and the area of dense surface shell.

Figure 2.3. Prehispanic mounds with multiple visible plaster floors in a house lot in the center of Ejutla de Crespo.

Figure 2.4. Carved stone with crossed arms (placed upside down) in the wall foundation of a house lot in Ejutla de Crespo.

The site's monumental core consists of a large, raised platform adjacent to a linear group of large mounds (see Figure 2.2). Two smaller structures are situated on top of the platform, one at each end; the center of the platform may have served as a fairly open plaza. The two tallest structures are part of the linear group of four mounds on the north side of the platform; three of the mounds partially enclose a plaza, open on the north, with the tallest structure on the east. Other prehispanic structures were dispersed across the town, including two on which churches were later constructed, one in the town's center and the other (El Calvario) near the area of dense shell (Figure 2.5). Most of the monumental structures are within modern house lots and have been heavily damaged; others are known to have been destroyed completely by modern constructions. Observations of exposed mound fill in several of the structures place initial construction between 200 BCE and 200 CE, and associated surface ceramics indicate continued use in later periods.

Shell was a rare find across most of the site. We did not observe any marine shell on or near the mounds in the center of town, and only one piece on the mound at the southern edge of the shell area. The shell was heavily concentrated in several agricultural fields along the eastern edge of town (and the prehispanic settlement), where many hundreds of pieces of broken shell glistened on the surface (Figure 2.6). During the survey we made three collections in this several-hectare area, picking up shell fragments, ceramics, obsidian, and other stone materials. Many shell fragments had cut edges and other evidence of working, either sawing, smoothing, or drilling. The collections include fragments of unfinished beads, disks, and bracelets, and small nacreous inlay pieces were numerous. Only two small disks and one drilled pendant were finished and complete. The identified taxa are all Pacific Coast species, including large gastropods—*Malea ringens*, *Patella mexicana*, *Strombus galeatus*, *Strombus gracilior*—and several pelecypods—*Ostrea iridescens*, *Pinctada mazatlanica*, *Spondylus princeps* (Keen 1971;

Figure 2.5. El Calvario on the top of a prehispanic mound just south of the area of dense surface shell.

Morris 1966). The most common of these, almost 60%, was mother of pearl, *Pinctada*. All these species were used in Mesoamerica as raw materials for shell ornaments and ritual items (e.g., Ekholm 1961; Kolb 1987; Pires-Ferreira 1975; Starbuck 1975; Suárez 1977), and several of these species were recovered from Early Formative contexts in the Valley of Oaxaca (Flannery and Marcus 2005, 81; Pires-Ferreira 1975, 1976).

Obsidian was unusually abundant in these fields. Of the almost 200 pieces of obsidian that we recorded across the site during the survey, more than half (112), mostly heavily worn blades, were collected from the area of dense surface shell, an area of several hectares compared to 130 ha for the entire site (see Figure 1.3). Because shell is a hard, abrasive material that tends to wear down stone tools quickly (Lewenstein 1987, 113; Parry 1987, 108), the association of the obsidian tools with the shell was additional support for shell working at Ejutla. There were many fewer tools of other stone materials visible on the surface.

Broken prehispanic pottery littered the area, with diagnostic sherds from Monte Albán Late I through Monte Albán V, but most abundant were the ubiquitous, undecorated G-35 bowls that date broadly to the Classic period (Feinman and Nicholas 2013, appendix IV). Ten of 11 figurine fragments, as well as the one spindle whorl and the two pottery wasters that we collected during the regional survey, were found in these fields. Based on these surface artifacts, it is likely that spinning and ceramic production were also practiced in this sector of the site.

Figure 2.6. Fragments of shell and prehispanic pottery visible on the surface of a field at the eastern edge of Ejutla de Crespo.

We centered one of the collection areas (CAE) in a field of dense shell and ceramics where there were many building stone fragments on the surface. The domestic character of the surface artifacts indicated that the stones were likely from a prehispanic residential structure. Did the occupants of this possible house also engage in other craft activities, or were those crafts carried out by different households in this ward or neighborhood at the edge of the site? That question would take excavation to unravel.

2.2. The Importance of Domestic Units in Mesoamerica

The household was an important Mesoamerican institution that had long-term durability (Kowalewski and Heredia 2020). This durability of domestic units was documented decades ago in the Maya Lowlands by stratigraphic excavations of houses that exposed long sequences of rebuilding and other activities carried out over time on the same spot (e.g., Willey et al. 1965). The same pattern was observed in excavations of Formative period houses in the Valley of Oaxaca in the late 1960s–1970s (Drennan 1976; Flannery and Marcus 2005; Whalen 1981). Generally, throughout the prehispanic era (Early Formative through the Postclassic period), household units were small, consisting of a nuclear family, although larger households did develop in some times and places (Kowalewski and Heredia 2020). These households were the principal units of production and consumption in prehispanic Mesoamerica (Hirth 2009a, 1).

Prior to our excavations in Ejutla in the early 1990s, most houses excavated in the Valley of Oaxaca dated to the Formative period (Drennan 1976; Flannery 1976a; Flannery and Marcus 2005; Whalen 1981; Winter 1972). The early house was a small, rectangular, one-room structure with a hard-packed earthen floor and walls built with wattle and daub, typically 15–25 m^2 in size (Flannery 1976b; Winter 1976a). Outdoor workspace surrounding the house comprised a range of features, including storage pits, hearths, ovens, activity areas, household middens, and burials, all within an area of 300–400 m^2 (Flannery and Marcus 2005, 34; Winter 1976a). These residential spaces were generally separated from each other by 20–40 m of open space (Winter 1976a).

Three Classic period houses excavated in a residential area north of the Main Plaza at Monte Albán had a different plan (Winter 1974). The houses, located on separate terraces and spaced approximately 25 m apart, had stone foundations and walls of adobe, with small rooms enclosing three or four sides of a central, square patio with a plaster floor. The deceased were often interred inside the house, typically in small tombs under the floor of one of the rooms or under the patio. Are these the patterns we would find in a Classic period residence in Ejutla, far from the capital?

Inspired by the survey findings at Ejutla, we returned to the site to excavate houses and examine household activities, not just the crafting of shell ornaments. Over four field seasons (1990–93), we excavated a small Classic period residence of intermediate status and its immediate surroundings, where we documented multicrafting by one household, but we were blocked from uncovering the entire house by adjacent modern house lots that limited the expansion of our excavations. And finding additional intact ancient houses in the heavily plowed fields (we did not find the house until the third year of the project) would be time-consuming.

During the regional surveys in both Oaxaca and Ejutla, we had mapped many hilltop sites where the ancient inhabitants had artificially flattened the slopes and constructed stone retaining walls to create flat spaces on which to build their houses. These sites are generally far from contemporary villages and have suffered less destruction from modern activities, such as heavy plowing. We often could see stone foundations and other remains of residential structures, and surface evidence of various craft activities was not uncommon. Terrace sites were a common form of settlement in Oaxaca, especially during the Classic period, when more than half of the population lived in one of these densely packed towns (Feinman and Nicholas 2013). The highest concentration of terrace sites was in the Tlacolula, or eastern, arm of the valley. A terrace site in Tlacolula seemed to be the ideal place to begin excavating more houses.

2.3. Excavations at Other Classic Period Sites in the Valley of Oaxaca

Our initial goal was to excavate a sample of houses at multiple locations to obtain household-level information on domestic activities that we could compare to Ejutla and begin to explore questions concerning the region's ancient economy (e.g., Feinman 1999; Feinman and Nicholas 2004a, 2007a, 2010, 2012). We ultimately excavated Classic period houses at three sites in the dry Tlacolula Valley, two hilltop terrace sites—El Palmillo and the Mitla Fortress—and a valley floor site—Lambityeco—in a setting more similar to the Ejutla site (see Figure 1.1). All four sites have extended occupational histories, although most of the excavated contexts pertain to the Classic period or the very beginning of the Early Postclassic period (ca. 900–1200 CE). Each site was at its apogee during the Classic period. At all four sites we excavated broad horizontal exposures to uncover complete houses and associated outdoor work and midden areas. To ensure comparability, we followed consistent field and laboratory methods and procedures (see chapter 3). At the three Tlacolula sites we recovered information that touches on many of the questions that we began investigating at Ejutla, and here we briefly describe the sites and the extent of our investigations.

El Palmillo is a large terrace site on the top and steep slopes of a rocky promontory that descends from the mountain ridge that defines the eastern edge of the Valley of Oaxaca. At its greatest expanse during the Classic period, the site's inhabitants had constructed more than 1400 terraces, most of which were residential (Feinman and Nicholas 2004b). Over a decade (1999–2008) we excavated eight houses on residential terraces spanning the bottom to the top of the hill (Feinman and Nicholas 2009, 2012; Feinman et al. 2002a). The three houses near the bottom of the hill were smaller and had fewer rooms than other houses we excavated at El Palmillo. The three residences at the top, near the site's civic-ceremonial core, were larger and more elaborate structures. We also excavated a small ballcourt situated between two of the more palatial structures (Feinman and Nicholas 2011a). Two houses on mid-slope terraces were intermediate in size and elaboration. Location on the hill generally reflects a status gradient at El Palmillo, with houses near the top showing signs of higher status than those closer to the bottom. During the excavations we collected ample evidence of a range of economic activities, including stone working and the processing of xerophytic plants in most houses, and ceramic production in the lowest set of residences (Feinman and Nicholas 2009, 2007b; Feinman et al. 2002a, 2007; Haines et al. 2004).

The Mitla Fortress is located on a freestanding rocky butte in eastern Tlacolula, approximately 10 km north of El Palmillo. The site is known mostly for a series of tall stone defensive walls that ringed the top of the hill in the Postclassic period (900–1520 CE), but the site was more than a military redoubt. During the Classic period it was a population center, with more than 500 terraces and other residential structures (Feinman and Nicholas 2004b). Between 2009 and 2011 we excavated houses on three residential terraces, two just below the defensive walls and one farther down the slope (Feinman and Nicholas 2011b, 2012; Feinman et al. 2010). In addition to working local stone and processing fiber from xerophytic plants, the site's residents made obsidian blades from imported cores and raised turkeys (Feinman and Nicholas 2012, 241, 244; Lapham et al. 2013, 2016).

Lambityeco has long been in the regional archaeological literature following excavations at the site by John Paddock in the 1960s (Paddock et al. 1968). This large site on the valley floor in the middle of the Tlacolula arm consists of two major architectural sectors that are largely chronologically distinct, the earlier sector (Yegüih) to the east (Formative through Early Classic, 700 BCE–500 CE) and the later sector (Lambityeco) to the west (Late Classic, 500–900 CE), where Paddock excavated two palatial residences (Lind 2017; Lind and Urcid 2010). During the early work at the site salt production and ceramic production were documented as important economic activities (Lind and Urcid 2010; Payne 1970; Peterson 1976). We worked at Lambityeco in 2013–16, excavating a residence and associated ballcourt, plaza, and temple in the main civic-ceremonial core of the site (Feinman and Nicholas 2016b, 2019a; Feinman et al. 2016), just south of the two palaces excavated by Paddock. We recovered relatively few stone or ceramic artifacts or features associated with productive activities; an exception was a cluster of large jars in the earliest surface of the residence that were likely used in salt production (Feinman et al. 2016). Instead, most of the material remains were associated with ritual activities, including incredible quantities of figurines and whistles and large ollas and serving vessels. Based on the modest size and layout of the residence, we suspect that its occupants were functionaries associated with ritual activities, perhaps low-level priests (Feinman and Nicholas 2019a; Feinman et al. 2016).

As we expanded our corpus of information on the material record from Classic period houses in the Valley of Oaxaca, we gained additional insights that sharpened our interpretations of economic activities at Ejutla and, more broadly, the prehispanic economy. Throughout the remaining chapters, we bring in material findings from El Palmillo, the Mitla Fortress, and Lambityeco as they are relevant. For some comparisons, the findings at sites where we excavated more than one house are presented as averages.

The construction of a corpus of domestic units for Classic period Oaxaca provides an analytical lens into domestic variability and the implications that diversity has on political and economic relations at scales larger than the household.

3

Research Program and Field Methodology

The questions we had about shell working at Ejutla were many, from more specific ones—what kinds of ornaments were made, how was the shell processed, what shell species were used, when did this activity take place—to broader ones about context and scale—were the production locale(s) residential, was there a division of labor between households, how was the shell procured, were ornaments made for local use or for broader networks of exchange? To answer these questions, we implemented a three-stage investigatory plan that was carried out over four field seasons (1990–93): surface collection, test pits, and large-scale horizontal excavations.

3.1. Exploratory Field Season

The first field season (July–August 1990) was largely exploratory (surface collection and test pits), to produce a detailed map of the shell-working area, to collect surface information on spatial variability in shell and other artifact distributions, to gather subsurface evidence of shell ornament production, to gain a preliminary chronological assessment of this activity, and to gauge the stratigraphic integrity of the area of surface shell and its suitability for large-scale excavations (Feinman et al. 1991). The latter was a primary concern, as the dense prehispanic debris concentrations that we noted in the area with surface marine shell raised the worrisome prospect that much of this area was already impacted by contemporary farming.

We began this fieldwork by preparing the map, using Brunton pocket transits and 100 m tapes. We recorded all modern features (structures, fences, roads and footpaths, and watercourses) in the fields on the east side of town where we had found surface shell during the regional survey (Figure 3.1). The area with surface shell debris was approximately 4.9 ha, although the western boundary was difficult to define because of modern constructions that were encroaching onto the fields that were littered with surface shell.

Once we prepared the detailed map of the shell-working area, we laid out a grid of 20 × 20 m blocks across the area. The grid was drawn to include not just contemporary agricultural fields but also some adjacent modern house lots where there was good surface visibility (Figure 3.2). The initial 45 blocks in the grid covered approximately 37% of the area with some visible surface shell and 90% of the 2 ha area with the densest surface concentrations of shell. Each 20 × 20 m block was divided into 100 2 × 2 m units (the provenience designations for all surface and excavation units refer to the southwest corner of that unit). To assess variation in surface material and the

Figure 3.1. The area with surface shell, planted in corn, extends east to the line of trees in the background.

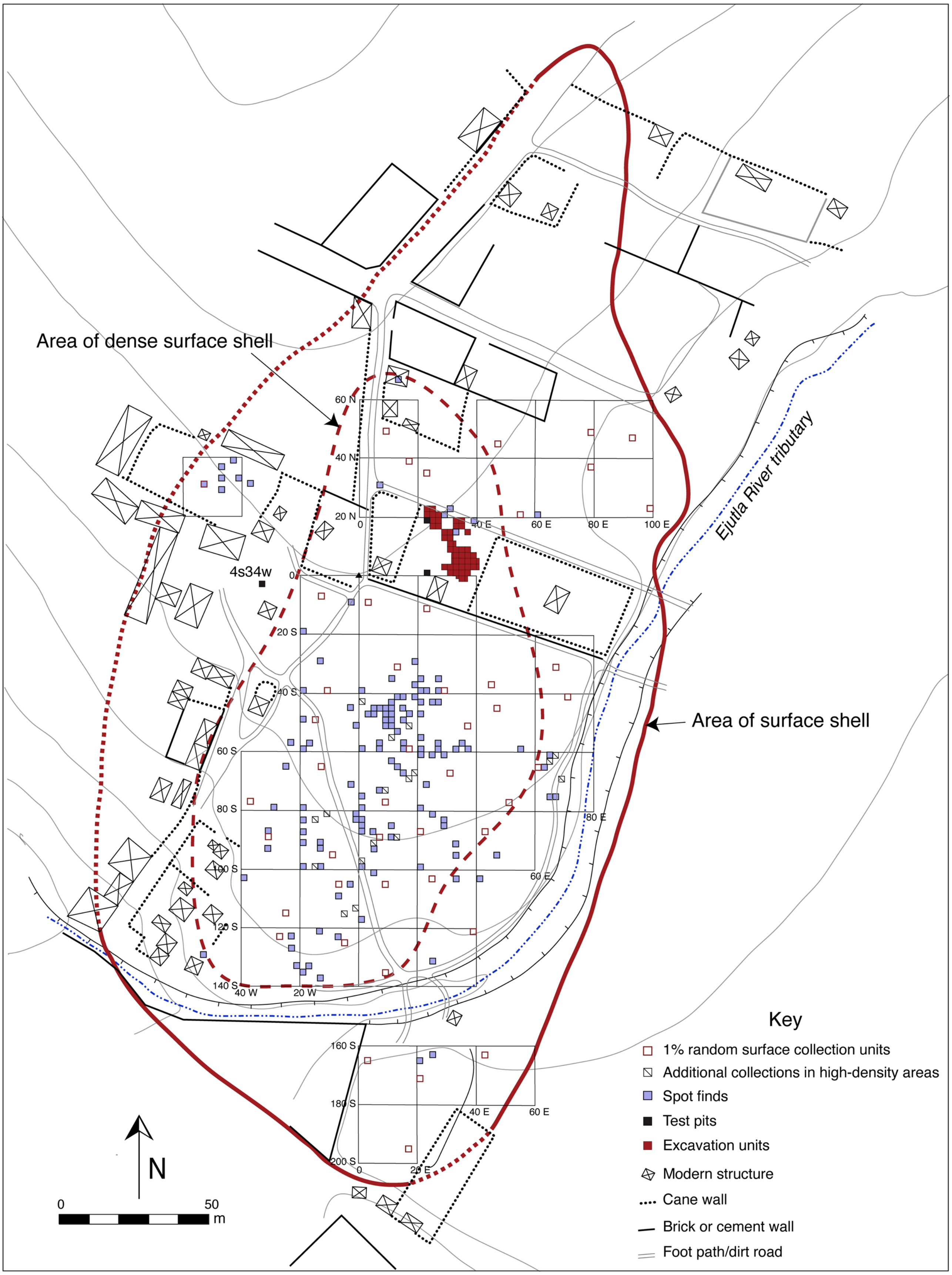

Figure 3.2. Map of the area with dense surface shell on the eastern edge of Ejutla de Crespo, showing location of collection areas, test units, and block excavations.

densities of all artifacts (not just shell) across the area, we began with a 1% sample of one 2 × 2 m unit randomly selected in each block. All artifacts visible on the surface were collected from these units, including shell, ceramics, obsidian, chipped stone, and other miscellaneous objects. Vegetation was removed as needed to provide comparable visibility. We took notes on the density of shell debris in each 2 × 2 m unit, associations with other materials, and the presence of building stones and other evidence of prehispanic structures.

In the second stage of the surface study, we expanded the random sample to 4% in the six 20 × 20 m blocks with the densest surface concentrations of shell to provide more information on the artifact assemblages associated with the shell debris. In the final stage of surface collection, we intensively walked over all the fields and other open spaces (including areas beyond the initial 45 blocks). For this walkover, crew members spaced just 2 m apart were instructed to collect all large pieces of shell, cut shell, and other significant (e.g., spindle whorls) or unusual artifacts visible on the surface. This step increased the representation of shell artifacts that had technological indicators of working or other attributes of modification. We also expanded the samples of other chronologically diagnostic artifacts that were not found, or were represented in low quantities, in the random surface collections. All objects collected were provenienced to specific 2 × 2 m units. These nonrandom collections provided additional information on the shell taxa that were procured, the principal techniques that were used to work the shell, and the range of ornaments crafted from the shell.

Once we had assessed the surface artifacts across this area, we began to collect information on the nature and depth of the prehispanic deposits. Ejutla de Crespo is located in an area of rich alluvial land along the Ejutla River and a small tributary that has been farmed and plowed for centuries. Although soils are deep in much of the area, part of the town (and site) is built on a low bedrock spur (see Figure 2.2). To evaluate the depth and integrity of subsurface deposits in the fields on the eastern edge of town, we used both subsurface probes and test pits. The probes were made with a 10 cm diameter post-hole digger. Then, three 2 × 2 m test units were selected based on surface findings, modern use, topological and geological observations, and local permissions. The test units were excavated in 10 cm arbitrary levels, divided by natural or cultural strata when they were discernable. All excavated deposits were screened, 75% in 1/4" mesh and 25% in 1/8" mesh. All artifacts were collected, and several charcoal samples for ^{14}C dating were taken from intact deposits.

Several probes and one test unit revealed that soil deposits were shallow and plowed to bedrock in parts of the area of the densest surface shell. In test unit 4s34w, we reached bedrock between 15 and 18 cm below the surface, with all cultural material in the disturbed plow zone (see Figure 3.2). All the levels in this unit contained low densities of ceramics and shell. Several probes in the center of the shell area with the densest surface remains, including one area with fragments of building stone, also reached bedrock within ~30 cm below the surface, with no intact or undisturbed prehispanic remains.

The other two test pits and several probes revealed deeper, undisturbed deposits. These test pits were placed in a mostly enclosed house lot that was not included in the original 20 × 20 m grid, but where we did make nonrandom collections during the intensive pedestrian search of the area (Figure 3.3, see Figure 3.2). The landowner kindly gave us permission to excavate in his house lot (and naturally, we hired him, and as a mason by trade, he became an excellent excavator).

We did not find architectural features or house floors in either test pit, but in the northern one (18n22e) we exposed a dense midden. This test unit contained 0.9–1.2 m of deposits above bedrock (Figure 3.4). The plow zone (both modern and historic) was approximately 40–45 cm thick and contained potsherds and plaster flecks but only small quantities of shell debris. The lower 50–75 cm were undisturbed cultural deposits with considerable quantities of shell debris, many large potsherds, numerous pieces of chipped stone and obsidian blades, and fragments of plaster. Shell collected from two contiguous 10 cm levels in this unit accounted for 73% of all excavated shell (by weight) recovered during the 1990 field season. One level alone yielded 1 kg of shell, including thousands of fragments of debris and cut shell (Figure 3.5).

A second test pit (0n22e) reached a depth of 65–75 cm below the surface. The plow zone was approximately 30 cm thick, with 30–50 cm of undisturbed deposits below. This unit contained large amounts of pottery and other artifacts, including some cut shell, but much less overall than in the test pit (18n22e) to the north.

All collected artifacts were washed, analyzed, and recorded in the field laboratory after the fieldwork was completed. Ceramics were coded and described following procedures used in the surveys of the Valleys of Oaxaca and Ejutla (see Blanton et al. 1982; Kowalewski et al. 1989). Shell artifacts and debris were sorted and recorded according to type of finished object, stage of production (such as blanks for beads or pendants, pieces with cut marks, chipping debris, etc.), or body part (for larger discarded pieces). Larger shell fragments were identified to genus and species, when possible, using standard reference guides (Abbott 1974; Abbott and Dance 1982; Keen 1971; Morris 1966). Lithic artifacts were coded according to material (obsidian, chert, etc.) and type of tool or debris. Other materials, including small pieces of mica and fragments of bone, that were present in very low frequencies were noted on artifact forms.

Figure 3.3. Team members, Scott Fedick (left) and Gary Feinman, taking notes and collecting the surface of test unit 18n22e, located inside a modern house lot.

Figure 3.4. Shell fragments and broken pottery visible in the south profile of test unit 18n22e.

Based on observations derived from the intensive surface collections and select test pits, we established that marine shell was worked into ornaments at Ejutla during at least the Classic period. All identified shell recovered from these collections was identified as native to the Pacific Coast, comprising 20 different varieties (separate genus and/or species), most of which had previously been recorded in other prehispanic contexts in highland Mesoamerica (e.g., Starbuck 1975). Nacreous mother of pearl, *Pinctada mazatlanica*, was the most abundant species, especially

Figure 3.5. All the marine shell collected from level 5 of 18n22e.

in the dense shell layers in 18n22e. Other shell taxa that were well represented in the collections include the large gastropod, *Strombus* (especially *S. galeatus*), the colorful pelecypod, *Spondylus* (more commonly *S. princeps* but also *S. calcifer*), and the large limpet, *Patella mexicana*. The shell was worked into a range of ornaments, including beads, disks, pendants, bracelets, and *placas* (small angular cut pieces) that were likely intended for mosaic inlay. Some were blanks for beads or pendants that were never finished. Overall, though, the ornaments were greatly outnumbered by shell debris, including fragments with cut marks, other unwanted or unusable parts that had been cut away, and tiny chipping debris recovered from the 1/8" mesh. Chipped stone tools and large quantities of small stone flakes and debris were also found in association with the shell in subsurface contexts, and based on the shell debris, the ornaments themselves, and the tools and other chipped stone debris, we documented various technologies that were used to work the shell (see Suárez 1977, 1981), including heavily worn obsidian blades that were used to cut the shell and chert microdrills that were used to perforate beads and pendants for stringing (e.g., Lewenstein 1987, 67).

One unexpected finding from the 1990 fieldwork was surface evidence of lapidary crafts. We collected seven small, stone drill plugs that have been recognized as a byproduct of hollow drills used to manufacture stone bowls (Diehl 1983, 101–02; Saville 1900). The plugs varied in length from ~1.5 to 3 cm but had standardized diameters, 9–11 mm, similar to many of the shell disks that we had collected on the surface and in the test pits. We suspected that the same hollow tubular drills (likely of cane, see Caso 1965, 905; Coe 1965, 595–96) were used to extract circular disks from larger pieces of shell.

The abundance of shell debris, unfinished ornaments, and tools used to work the shell conforms to a manufacturing context. We did not find any cultural or architectural features in association with the midden of dense shell to define the context of production, but the likelihood that shell ornaments were crafted nearby encouraged us to return to Ejutla the following summer to expand the excavations into adjacent units.

3.2. Large-Scale Horizontal Excavation

From 1991 to 1993, we expanded the excavations from the initial test unit (18n22e) to expose an area of 190 m^2 in the eastern sector of the Ejutla site (Figure 3.6). The excavations took place entirely within one modern house lot, where additional subsurface probes revealed deep, intact deposits; however, further expansion was limited by modern structures and property boundaries. No attempt was made to obtain permission to excavate in the open fields to the south where additional subsurface probes

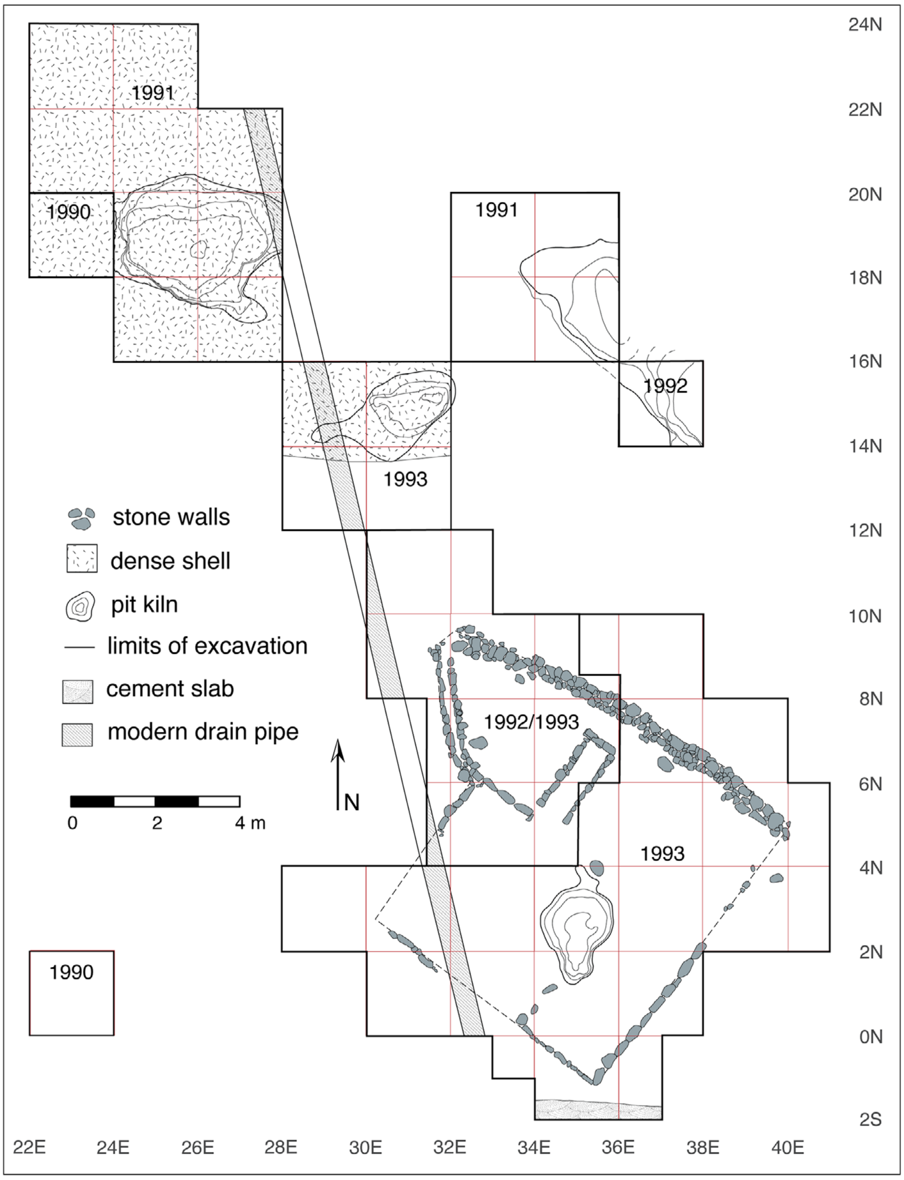

Figure 3.6. Map showing the areas excavated each year of the project.

corroborated the prior year's findings of high bedrock and fewer intact subsurface deposits.

We used the same 2 × 2 m grid that we laid out for surface collections and test pits and followed the same basic excavation procedures we had used in the 1990 fieldwork (Feinman et al. 1991). We excavated in natural/cultural stratigraphic layers, subdividing them into 5 or 10 cm levels (depending on context and nature of the deposits) in thicker strata and changing to new levels at stratigraphic boundaries. Discernible features including pits, hearths, burials, dense middens, and possible rooms were excavated separately within each level. Heavier tools (shovels, *baretas*) were used to remove the disturbed plow zone, whereas smaller tools (trowels, ice picks, dental picks, and brushes) were used for intact deposits where the density of artifacts, especially shell, was high. Within excavation blocks, we followed features into adjacent units and exposed broad horizontal areas before excavating to lower levels. All units were excavated to the underlying bedrock.

All excavated soil was screened in either 1/4" or 1/8" mesh, depending on the context and nature of the deposits (Figure 3.7). Soil from the disturbed plow zone was screened in 1/4" mesh, while all deposits with dense shell debris were screened with 1/8" mesh to recover the byproducts and residues of manufacturing activities as well as tiny beads that could slip through the 1/4" mesh. All recovered artifacts were collected separately by unit, level, feature (when present), and material (ceramics, shell, lithics, bone, etc.). Other remains, such as mica, stucco, burnt rock, daub, were recorded for each provenience, and in some cases were collected. The presence of charcoal was always noted, and samples were taken for ^{14}C dating

Figure 3.7. Crew members excavating and screening excavated deposits at Ejutla.

when adequate amounts were present in intact contexts of significance. Soil samples for flotation were collected in select contexts, but in general, prehispanic organic material was rare or poorly preserved. All collection bags were recorded on a master list by year to track bags and help root out recording errors.

We completed a form for each excavated level, recording the depth of the level, the tools used to excavate the level, size of screen mesh, soil descriptions, any observed features, general descriptions of the recovered artifacts, all unusual artifacts, charcoal samples (if collected), and the general nature of the deposits. For each level, we mapped artifact distributions, all features, and exposed bedrock, and elevations of all significant elements were recorded on the map. All features, artifact concentrations, and wall profiles of finished units were photographed.

Basic analysis of principal artifact classes was completed during each field season. All artifacts were catalogued, washed, measured, coded, and weighed in the field laboratory concurrently with fieldwork and during the final weeks of each field season after the excavations had been closed. All significant artifacts were photographed, and select artifacts were drawn.

We began the block excavations in 1991 with units adjacent to 18n22e, the test unit in 1990 that had the greatest amount of shell debris (see Figure 3.6; Feinman et al. 1991). The densest shell deposits in 18n22e were in the northeastern corner of the unit, so we expanded to the north and east. The plow zone was between 40 and 55 cm deep, and below that we followed the dense midden of ceramics, shell, and associated production debris into adjacent squares (Figure 3.8). Dense shell deposits extended across the 10 new units we opened in this excavation block. In addition to

Figure 3.8. Exposed midden in unit 18n24e with dense ceramics and shell debris.

the heavy volume of shell, we recovered debris indicative of lapidary activities (confirming surface findings in 1990), cloth production, and ceramic vessel and figurine manufacture, including several figurine molds.

Below the midden we encountered ashy deposits mixed with heavy concentrations of ceramics (Figure 3.9). The deepest levels were below the midden in the southeastern part of this excavation block, where the bedrock had been artificially dug out to form a roughly circular pit whose base was 190 cm below the modern surface (Figure 3.10). Some of the ceramic fragments were from large vessels that had been placed upside down near the bottom of the pit.

The second excavation block was 4 m to the east and consisted of four units. The plow zone was deeper (55–65 cm below the surface) and almost completely devoid of artifacts. The levels below the plow zone also contained much lower densities of material, especially shell debris, than the excavation block to the west. Very little cultural material was recorded until the lowest levels, where we encountered ashy layers containing high quantities of ceramics and a second large pit that had been dug into the bedrock to a depth of 225 cm below the modern surface (Figure 3.11). This ash-filled feature extended beyond the limits of the excavation block. The bedrock at the base of both pits was burnt. Based on the presence of the heavy ash deposits, the characteristics of the ceramic assemblages, and other indicators of pottery production, these features were more than just ash pits, most likely firing pits, or pit kilns.

In 1992, we undertook a brief field season to better document the firing pit that was partially excavated in the eastern block in 1991 and to define the southern limits of the midden with dense shell debris in the western block. We began with two 2 × 2 m units. Our findings in the unit adjacent to the eastern block (14n36e) provided additional information on the size and contents of the pit kiln. We also exposed part of a third, lower firing feature, indicating that the specific location for firing may have shifted with some regularity (Figure 3.12). Given the depth of the firing features (>2 m below the surface) and the brevity of the field season, we were unable to excavate additional units to expose the pit kilns completely.

The other unit (8n32e) was placed in an area that we had been unable to access in 1991 due to contemporary usage. There was no surface evidence in the general area (building stone, vegetational differences, etc.) to guide us on what we might find. We did not come down on dense

Figure 3.9. Ashy deposits and ceramics near the base of 18n24e.

Figure 3.10. Partially exposed base of large pit in 18n24e and adjacent units.

Figure 3.11. Dense layer of ceramics and stones in ashy deposits in 18n32e.

shell debris below the plow zone as we had in the western excavation block to the north; instead, in a comparable stratigraphic layer, we exposed the top of a roughly formed wall of large unmodified cobbles and some shaped stones extending across the northern half of the unit and a largely perpendicular wall of smaller, shaped stones along the western edge of the unit (Figure 3.13). We expanded the excavations into adjacent units to follow the stone foundations in both directions. The wall of large cobbles continued to the east to the edge of the exposed area, while the stones on the west were part of two parallel lines of stones that appeared to be a drain exiting the northeastern corner of a room, or patio, defined by two perpendicular lines of shaped stones (Figure 3.14). There was a small firepit in the area enclosed by the stone foundations. We eventually opened 35 m^2 in 10 full and partial units. These units were not excavated to bedrock; rather we extended the units horizontally to expose as much of the structure as possible in the limited time we had. Based on the shell debris, finished shell ornaments, and various indicators of ceramic manufacture that we found in and around the stone foundations, the structure is contemporaneous with the shell working and ceramic firing activities previously identified in this sector of the site. Other artifacts found in association with this multiroom structure indicated that it was domestic in function, tying the craft activities to a residential context. The location of craft middens adjacent to the excavated structure also conforms with ethnoarchaeological findings that garbage created by residential units generally is deposited on the house lot, but not in areas that interrupt other household activities (e.g., Hayden and Cannon 1983).

In 1993, we returned to Ejutla to excavate the rest of the residential structure (Figure 3.15). After removing the backfilled dirt from above the structure walls exposed in 1992, we continued to open up units as we removed the plow zone and then followed the stone foundations of the structure into adjacent units. A full exposure of the structure was limited, however, by contemporary features (Figure 3.16), including the house lot boundary

Figure 3.12. Ash-filled pit in 14n36e.

Figure 3.13. Roughly formed wall of stones in 8n32e.

(on the north and east), a modern drainpipe (on the west), and a cement slab (on the south) (see Figure 3.6). Once we defined the fullest extent possible of the prehispanic house, we excavated to lower levels in broad horizontal exposures until we reached bedrock or sterile deposits, following the same procedures as in the 1991 and 1992 excavations. The northern part of the structure was sitting on a patch of higher bedrock (approximately 90 cm below the surface), while the bedrock was much lower to the south (~185 cm below the surface), where in the lowest

Figure 3.14. Small firepit in the area enclosed by the stone-lined drain and north wall of the prehispanic structure.

levels we found a small, stone-lined firing pit under the house floor.

A block of units excavated north of the structure connected the 1992–93 excavations to the blocks excavated in 1991 (see Figure 3.6). In these units we defined the southern edge of the dense shell midden, which ended 4–5 m north of the house. Just below the midden was another small firing pit.

All artifacts were preliminarily analyzed before the end of the field season. Given the high quantities of artifacts and debris from a range of craft specializations that we collected during the four years of excavation, all mixed with domestic trash, we returned to Oaxaca in the summer of 1994 to complete more detailed analyses. This further study of the materials informed and strengthened our discussions of the chronological sequence of the structure and associated features (chapter 4), the domestic assemblage (chapter 5), and the multiple craft specializations in which the residents of the excavated structure engaged (chapters 7, 8, and 9). These findings provided an empirical basis to re-envision the prehispanic economies of Ejutla, Oaxaca, and Mesoamerica (chapters 6 and 10).

Overall, the Ejutla excavations uncovered a significant segment of a Classic period house and exterior areas associated with that residential unit. The exterior areas included ceramic firing features, midden deposits, and offerings. The prehispanic residence was sufficiently exposed to estimate its size and spatial layout. Further excavation of those parts of the prehispanic house that were not exposed or studied was precluded by modern dwellings, associated living spaces, a contemporary footpath, and areas that were too disturbed to yield contextualized prehispanic materials. Nevertheless, what we were able to discover and study yielded one of the first horizontal vantages on a Classic period house in the Valley of Oaxaca outside of Monte Albán.

Figure 3.15. Area of excavations at the beginning of the 1993 field season, showing modern house lot walls and structures.

Figure 3.16. Team members excavating the prehispanic structure within the confines of the modern house lot.

4

The Residential Complex

During the four summers (1990–93) of investigation in Ejutla, we excavated a contiguous area of 190 m^2 in the area of dense surface shell at the eastern edge of both the prehispanic site and the modern town. The excavation exposed a multiroom structure with rooms around an interior patio. The structure included a small subfloor tomb, kitchen area, and stone-lined drain. Domestic trash in and around the structure confirmed its residential character. Associated exterior space included several ash-filled pits, one of which was subsequently covered over by construction of the house; a midden area with high concentrations of cut shell mixed with domestic garbage; and the simple pit burial of a single individual (Figure 4.1). The middens and the pits contained high densities of ceramics, including numerous pottery objects and vessel wasters, defective figurine fragments, and molds that are indicative of ceramic production. These subsurface findings confirmed our surface observations that residents of this sector, or neighborhood, of the Ejutla site engaged in several different craft activities, most notably the working of marine shell. The fieldwork also specifically enabled us to associate multiple craft activities with one residential structure.

In this chapter, we describe physical details of the excavated house, the subfloor tomb, and the firing features, followed by a discussion of the ceramic chronology and ^{14}C dating of the excavated features and associated craft activities. In chapter 5, we present the artifact assemblages and other material remnants associated with the excavated house and tomb that support our interpretation that the structure was a domestic residence. These basic findings provide a foundation to discuss implications of the specialized production that we documented. These production activities were implemented in a domestic context, and the evidence for multiple kinds of craftwork in this residential context have important ramifications for how we contextualize the prehispanic economy of Oaxaca and beyond (chapter 6). Subsequent chapters focus on the specific craft activities associated with the residents of the house: ceramic production, including figurines (chapter 7), the crafting of shell ornaments (chapter 8), the working of stone into tools and lapidary objects (chapter 9), and the fashioning of animal bone into tools and other decorative pieces (chapter 9).

4.1. The Residential Structure

The prehispanic house that we excavated in Ejutla was defined by a foundation of stones that demarcated several rooms around a small patio (Figure 4.2). These basal stones would have helped preserve the integrity of the walls from damage by water seepage (Barnard 2016). Outbuildings and other surface features of a modern house lot blocked us from expanding in all directions to confirm the full extent of the house (Figure 4.3), but we fully exposed the patio and the northern and eastern rooms (Figure 4.4). Areas to the west and south, where prehispanic rooms were likely situated, were partially destroyed by several post-occupation activities. The base of a colonial adobe wall had cut through part of the southern wall of the prehispanic patio, a modern pit had removed a section of the western patio wall, and a modern drainage pipe cut a north–south path through the western portions of the excavated area and further impacted the southern and western edges of the patio.

Partially preserved foundation walls of flattened and shaped rectangular stones defined the edges of the residence's small patio. The patio enclosed an area of 4.5 × 4.3 m and was oriented approximately 35° east of north. The best-preserved foundation walls were in the northwestern corner of the patio, where a stone-lined drain allowed water to flow from the patio to beyond the northwestern edge of the residential structure (Figure 4.5). Roughly shaped stones formed the sides of the drain, and smaller flat stones lined the bottom. A small room on the east side of the patio was approximately 2.5 × 4.3 m in size. A foundation of large, roughly formed rectangular stones formed the eastern, exterior wall of the room, while a line of much smaller and thinner rectangular stones marked the southern edge of the room (Figure 4.6). Although only a few foundation stones in the northern and western (interior) walls of the east room were preserved, they appear to have defined a small, covered living space that was entered from the patio. During the excavations we also uncovered an offering of two small, carved ceramic vases that had been placed outside the corner of the east room, most likely as part of a dedicatory ritual during construction of the house (Figure 4.7, see also Figure 4.2).

Centuries of plowing the agricultural fields around Ejutla had disturbed the prehispanic structure, and the uppermost floor(s) of the rooms around the patio and the walls above the stone foundations were not preserved, but some small flecks of plaster were present in levels where the top surfaces of the stone foundations first became visible. The lower and subfloors of the patio and the east room consisted of a mixture of earth and crushed bedrock. In subsequent investigations at El Palmillo, we excavated a series of houses on residential terraces (Feinman et al. 2001a, 2001b, 2002a). In these contexts,

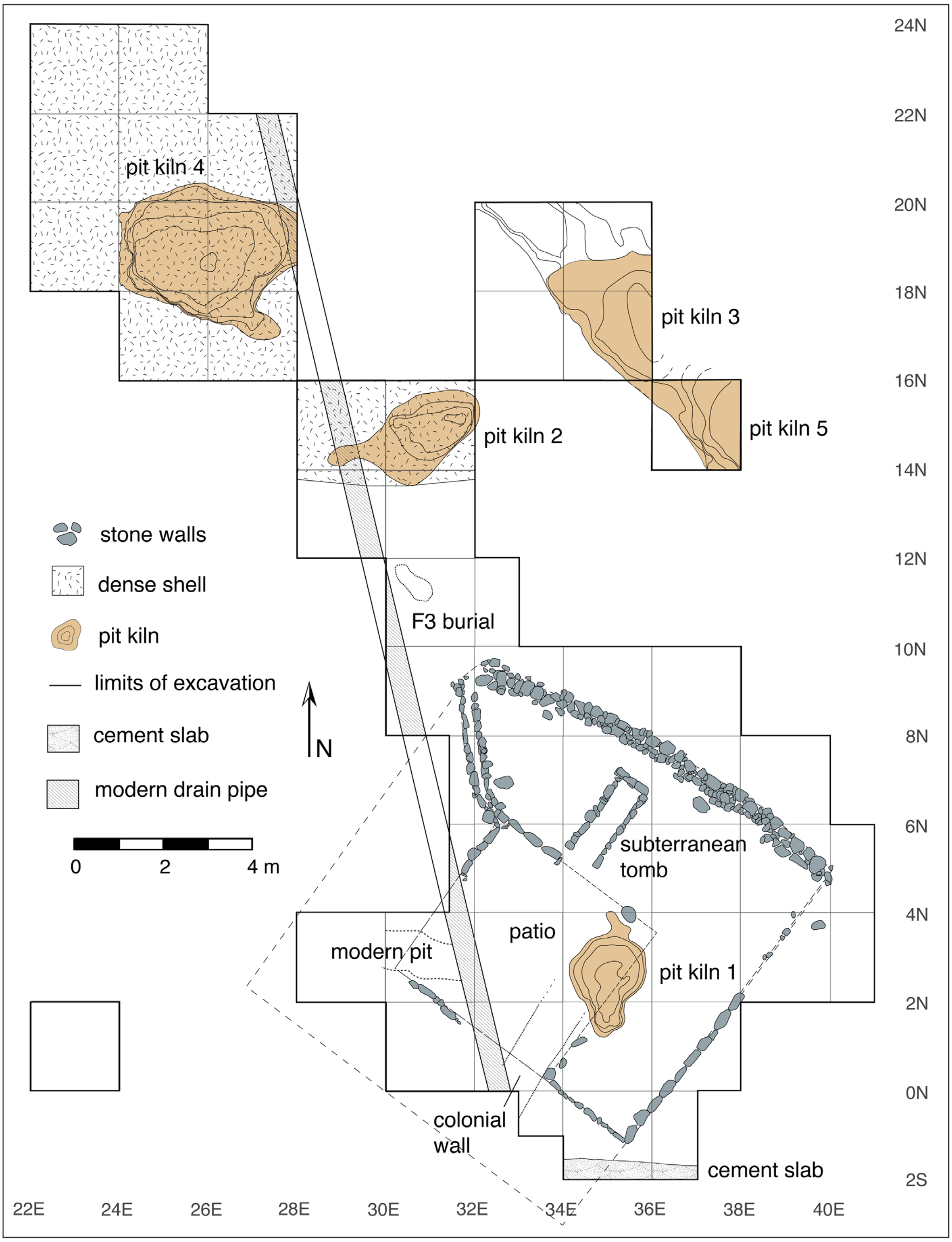

Figure 4.1. Map of the excavated features at Ejutla, showing the extent of the dense midden north of the residential structure and the location of all five pit kilns.

on hillslopes far from town and never deeply plowed, the houses were far better preserved. Based on what we learned about domestic architecture at El Palmillo, the plaster flecks recovered in the upper excavated levels in Ejutla are most likely the remnants of thin plaster layers generally applied to domicile floors, and sometimes to adobe walls, or both.

The walled space on the north side of the patio was much larger than the east room, measuring approximately 9.5 × 3.2 m. This northern area was only partially enclosed. The northern wall of this space was of very different character than the stone foundations of the patio and east room, which consisted of single lines of shaped rectangular stones. The wall defining the northern edge

Figure 4.2. Map of the excavated house and associated features.

of the structure was much more substantial, constructed of two parallel rows of much larger roughly shaped and unshaped stones and small boulders that were set deeper into the underlying fill (Figure 4.8). On the west, the stone wall abuts the northern end of the drain from the patio that passes through the room. On the east, the wall ends in line with the exterior foundation wall of the east room. These two walls did not connect, leaving the northern area open on the east. There was no evidence that foundation stones had been removed from this area.

A small stone-lined tomb on the north side of the patio divided the northern space roughly in half. In the western area, between the drain and the tomb, there was evidence of burning and the preparation of food, a possible kitchen area (see Figure 3.14). In the eastern half, there were several superimposed stone and sherd pavements that appear to have been work surfaces (see Figure 4.2). The larger one, approximately 2 × 2 m, was roughly squared and abutted the northern edge of the east room (Figure 4.9). This pavement extended approximately 0.5 m beyond

Figure 4.3. Crew excavating the prehispanic structure surrounded by outbuildings in the modern house lot.

Figure 4.4. The patio and north and east rooms of the prehispanic structure.

Figure 4.5. The stone-lined drain in the northwest corner of the patio.

Figure 4.6. The stone foundations of the eastern and southern walls of the east room.

the end of the northern wall of the structure and the edge of the east room. The wall separating this pavement from the room to the south may have been perishable, as the only evidence of a wall here was a partial line of small stones perpendicular to the northern end of the exterior wall of the east room and in line with the northern edge of the patio. Next to the smaller pavement was a shallow pit that contained several large, thick pieces of mica that were stored as raw material (Figure 4.10).

Figure 4.7. Offering of two carved ceramic vases outside the southeastern corner of the east room.

Figure 4.8. The north wall of the residential complex (the orange flagging tape marks the corners of 2 × 2 m units).

Figure 4.9. Top of the ceramic and stone pavement in the eastern part of the north room.

Figure 4.10. Large sheets of mica in a small pit near the ceramic pavement in the north room of the structure.

Although rooms on the southern and western sides of the patio were not confirmed by the excavations, the small stones in the foundation of the southern wall of the east room are not substantial enough to have sustained a thick adobe wall, compared to the much larger, roughly shaped stones in the foundation of the exterior eastern wall (see Figure 4.6). The stones in the southern and western walls of the patio also are smaller than those in the exterior structure walls on the north and the east. In addition, there were many fewer ceramics and other debris beyond the southern and western edges of the patio than there were along the eastern and northern edges of the structure, where middens built up over time outside the walls of the house (Figure 4.11). The per-unit quantity of artifacts collected from the projected rooms on the southern and western sides of the patio were much more comparable to the interior areas of the house than to the exterior midden areas on the north and east. Based on these observations, we strongly suspect that there were rooms on the south and west sides of this complex that were destroyed by subsequent, post-use activities. If rooms on the southern and western sides of the patio were the same width (2.5 m) as the east room, then the total size of the house would have been approximately 9.2 × 10.3 m.

Figure 4.11. Broken *sahumador* (incense burner) and other trash on the north side of the residential complex.

The house plan that we propose would conform with the houses unearthed at other Classic period sites in the Valley of Oaxaca. These domestic residences generally had three or more rooms around a central patio (e.g., González Licón 2003; Marcus and Flannery 1996, 222; Winter 1974). The patios of the smaller houses that we excavated on the lower and middle terraces at El Palmillo and the Mitla Fortress were enclosed by rooms on three sides, with the fourth side open to the terrace retaining wall (Feinman and Nicholas 2009, 2011b). In the larger residences that we exposed near the top of El Palmillo and for the residence we excavated at Lambityeco, in an alluvial setting similar to Ejutla, the patios were enclosed by rooms on all four sides (Feinman and Nicholas 2009, 2019a; see also Lind and Urcid 2010). These comparative perspectives align with the ground plan that we have suggested for the excavated house at Ejutla.

Overall, inequality during the Classic period in the Valley of Oaxaca (as assessed based on comparative house sizes) was relatively muted compared to that in contemporaneous Classic period Maya Petén polities (Blanton et al. 1996; Feinman and Nicholas 2007c, 2012, 2016a, 2020a; Feinman et al. 2018a; Thompson et al. 2021). Nevertheless, status differences in Classic period Oaxaca were manifested in domestic architecture. For the 12 houses we excavated at El Palmillo, Lambityeco, and the Mitla Fortress (Feinman and Nicholas 2009, 2011b, 2019a), house size ranged in a gradient from 18 m^2 to 437 m^2, with the median around 98 m^2. The Ejutla residence, as estimated, was ~95–100 m^2, and so near the median (Table 4.1) of this sample. The excavated house at Ejutla is most comparable in size to commoner residences at the Mitla Fortress and to houses situated on two mid-slope terraces at El Palmillo.

Compared to a broader sample of excavated Classic period houses from the Valley of Oaxaca that also includes Monte Albán (see Table 4.1; Feinman et al. 2018a, 273–74), the size of the Ejutla house is fairly typical of commoner residences of middle status. For this larger sample, we also compared patio sizes, as even in houses that are not completely excavated or preserved, it usually is possible to estimate the size of the patio. The patio in the Ejutla house was approximately 19.3 m^2, well within the range of patio sizes for excavated houses in the larger sample, in which values ranged from 12 m^2 to almost 110 m^2 (with one outlier at Monte Albán that was almost 150 m^2) (Feinman et al. 2018a, 273–74). In this sample, which skews toward larger houses, given the focus of prior excavations on elite contexts at Monte Albán (e.g., Bernal 1965; Robertson 1983), about a third of the patios were smaller than 20 m^2. From a larger sample of patio sizes based on the surface survey of Monte Albán (Blanton 1978), roughly half of

Table 4.1. Size of patios and residences at excavated Classic period sites in the Valley of Oaxaca.

Site	Residence	Patio area (m^2)	Size of residence (m^2)
Ejutla*	–	19.3	95.0
El Palmillo*	T.1162	–	18.0
El Palmillo*	T.1163	20.3	86.3
El Palmillo*	T.1147/48	21.0	89.0
El Palmillo*	T.925	21.6	67.2
El Palmillo*	T.507	27.6	97.8
El Palmillo*	Str.35	46.2	224.8
El Palmillo*	T.335	97.3	285.0
El Palmillo*	P.11	108.8	437.0
Lambityeco*	M.165	19.3	100.0
Lambityeco	M.190	57.5	283.5
Lambityeco	M.195	73.9	460.0
Lambityeco	Golaba	20.2	–
Macuilxochitl	St.B, T.25	37.8	178.0
Macuilxochitl	St.C, T.25	49.7	325.0
Mitla Fortress*	T.56	28.0	89.6
Mitla Fortress*	T.57	36.0	130.6
Mitla Fortress*	T.276	23.0	94.4
Monte Albán	T.196	22.5	70.7
Monte Albán	La Presa	12.6	87.4
Monte Albán	T.194	36.0	94.1
Monte Albán	Carretera B	18.0	98.0
Monte Albán	Carretera C	12.0	105.0
Monte Albán	House 3	12.1	–
Monte Albán	Area L, Str.1	13.9	–
Monte Albán	Str.L (house)	31.4	233.1
Monte Albán	T.119/120	21.6	132.0
Monte Albán	System T.66	14.8	170.4
Monte Albán	Carretera A	19.4	176.0
Monte Albán	Est.C	25.0	216.0
Monte Albán	Pitayo	35.8	225.0
Monte Albán	Est.D	60.0	247.0
Monte Albán	Est.A’	42.0	261.0
Monte Albán	Est.A	36.0	324.0
Monte Albán	Bldg.104	92.0	414.0
Monte Albán	Este B	42.5	416.0
Monte Albán	Str.103	84.0	437.0
Monte Albán	Bldg.105	148.6	464.6
Monte Albán	Est.B	81.0	528.0
Monte Albán	Bldg.S	97.0	559.4

* Residences excavated by Feinman and Nicholas. Data for the other houses: Lambityeco (Lind and Urcid 1983, 2010), Macuilxochitl (Faulseit 2013), and Monte Albán (Caso 1935, 1938; González Licón 2003; Marcus 2008; Winter 1974).

the patios were smaller than 20 m^2 (Feinman et al. 2018a, 273); in both samples, the Ejutla patio is in the middle of the size range. Based on these comparative samples for the Classic period Valley of Oaxaca, the craftworkers that occupied the excavated house in Ejutla were neither at the top nor the bottom tail of the axis of economic status.

4.2. Subfloor Tomb

In the sample of Classic period houses that we excavated, the presence of a subterranean tomb, entered from the patio, also was more typical of houses at the mid or upper range of socioeconomic status. The subfloor tomb at Ejutla was not large, measuring approximately 2.25 m long by 1.0 m wide. Three walls of the tomb were constructed with large stone blocks (Figure 4.12), enclosing an interior chamber 2.0 m long, 0.6 m wide, and 0.7 m high. The construction was simple. On the long sides of the tomb, large stones as tall as 60 cm alternated with two or more smaller stone blocks placed one above the other (Figure 4.13). One of the largest stones in the west wall of the tomb was a huge, well-used metate, placed with the cavity of the metate facing outward on the exterior of the tomb. The north wall of the tomb (the head) was constructed with three large stone blocks, with a layer of small stones placed above them. Small stones and large potsherds were used to chink all three walls. The Ejutla tomb is similar in size and construction to small domestic tombs we subsequently excavated on two mid-slope terraces at El Palmillo (Feinman et al. 2001b, figure 14a, photos 43, 44; Feinman et al. 2002b, figure 17, photos 50, 51; Feinman et al. 2002a, 261) and in the residential structure we uncovered at Lambityeco (Table 4.2).

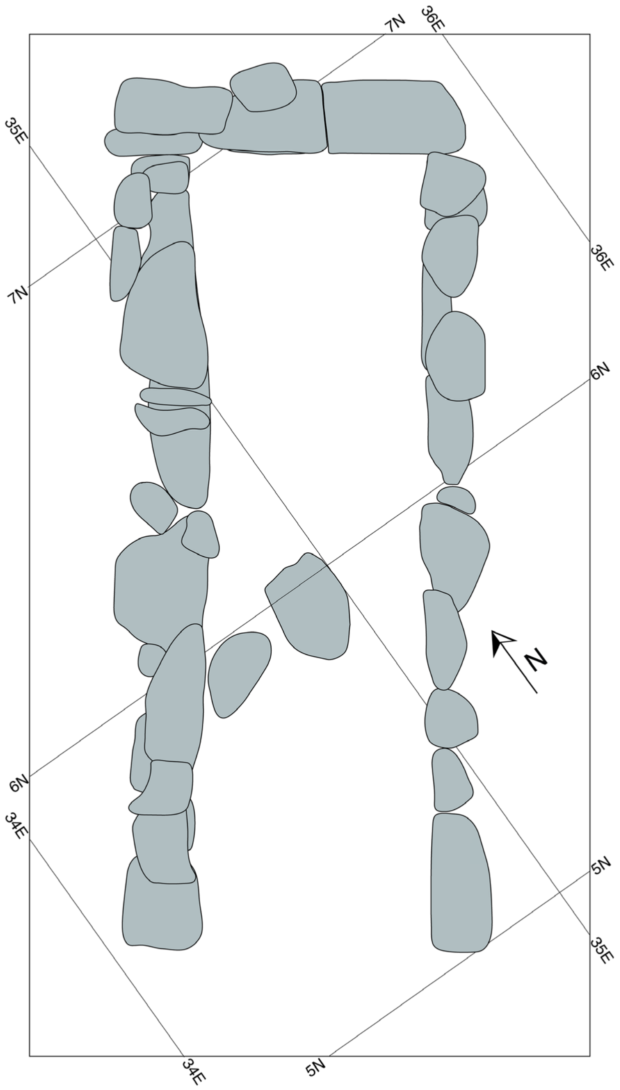

Figure 4.12. Drawing of the subfloor tomb on the north side of the patio.

As we first exposed the tomb, only the tops of the walls were visible (Figure 4.14). The southern end of the tomb (the foot) opened onto the patio. Unfortunately, the destruction of the uppermost floor of this house also disrupted the architectural conjuncture that must have linked the patio to the tomb entrance. In front of the tomb, cut into the patio floor, we did note a depression that facilitated entry into the subterranean tomb; it was filled with broken ceramic vessels (Figure 4.15), likely remnants of offerings left in front of the tomb that were broken during (and intermittently between) repeated use of the mortuary feature. One small, rectangular cut stone placed at a right angle to the stones in the patio wall marked what remained of the entry to the tomb from the patio. Stones in the ceiling of the tomb had been removed or collapsed in antiquity. Inside the tomb were several large stone slabs that had fallen from the roof and slightly disturbed the human remains, but these slabs would not have covered the entire tomb (Figure 4.16). The tomb was constructed on an area of high bedrock along the northern edge of the patio. The bedrock undulates, so it was necessary to flatten the bedrock and fill in natural depressions to create a flat surface for the tomb. Many of the large stone blocks in the sides of the tomb were sitting on bedrock, while

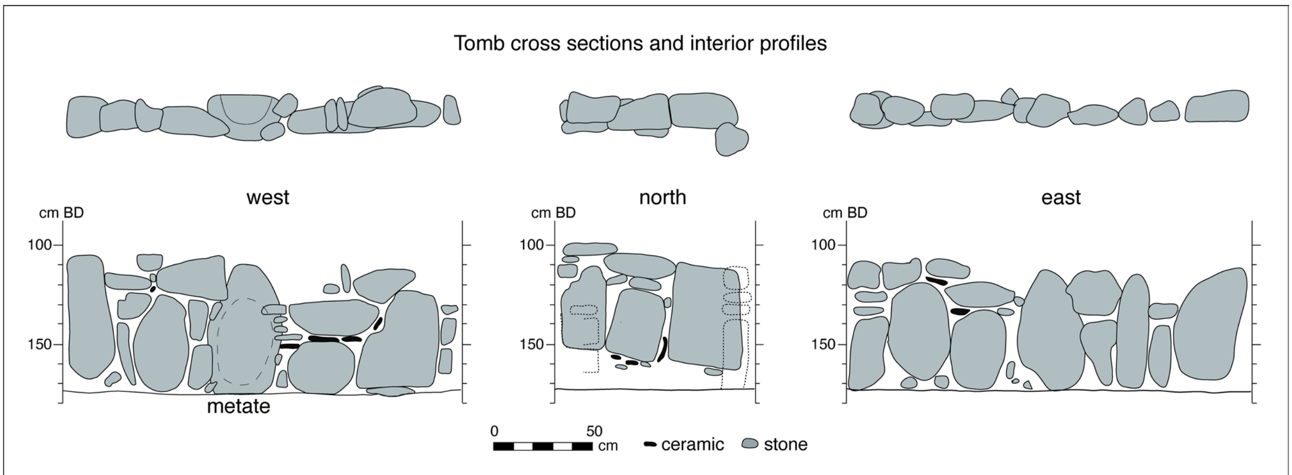

Figure 4.13. Cross sections and profiles of the stone walls of the tomb.

Table 4.2. Subterranean tombs at four Classic period sites excavated by Feinman and Nicholas.

Site and residence	Tomb	Exterior length (m)	Exterior width (m)	Interior length (m)	Interior width (m)
Ejutla	shaped stone	2.25	1.00	2.00	0.60
Lambityeco M.165	shaped stone	2.12	1.00	1.90	0.60
El Palmillo T.1162	no tomb	–	–	–	–
El Palmillo T.1163	no tomb	–	–	–	–
El Palmillo T.1147/48	no tomb	–	–	–	–
El Palmillo T.925	shaped stone	1.95	0.97	1.70	0.45
El Palmillo T.507	shaped stone	2.16	1.07	1.70	0.65
El Palmillo T.335	masonry tomb	2.70	1.82	2.08	1.13
El Palmillo St.35	no tomb or burials	–	–	–	–
El Palmillo Pl.11	masonry tomb	2.65	1.72	2.30	1.00
Mitla Fortress T.56	no tomb	–	–	–	–
Mitla Fortress T.57	no tomb	–	–	–	–
Mitla Fortress T.276	no tomb	–	–	–	–

Figure 4.14. The stone walls of the tomb exposed during the 1992 excavations.

others, especially in the short north wall, were sustained by compact fill (see Figure 4.13).

Several layers of overlapping flat cut stones formed a threshold at the foot of the tomb (see Figure 4.16). Given the similarity of this mortuary feature to the small domestic tombs at El Palmillo, there should have been a stone closing the entrance of the tomb, but there was no door stone above the threshold, nor did we find any large stone in deposits near the tomb that could have served that purpose. It was likely removed post-occupation with many of the capstones. The individuals interred in the tomb and associated funerary remains are discussed in chapter 5.

There was only one other burial associated with the prehispanic structure. Just off the northwest corner of the structure was a simple pit burial containing one individual. There were no offerings interred with this individual. The pit had been dug into the bedrock and eventually was covered with accumulating layers of midden deposits (see Figure 4.1).

Figure 4.15. Stone marker in the patio wall and deposit of broken ceramics in front of the tomb entrance.

4.3. Ash-Filled Pits

Several meters north of the structure was a zone of four roughly oval pits that had been carved into the soft bedrock

Figure 4.16. The tomb threshold and large stone inside the tomb from the collapsed roof.

(see Figure 4.1). A fifth pit was under the house subfloor, superimposed by the floor of the house. These pits were filled with dense layers of ash and broken pottery, including high quantities of defective sherds (Figure 4.17, Figure 4.18), and are similar to semisubterranean features at other sites in Mesoamerica that have been identified as ceramic-firing features (e.g., Abascal 1975, 1976; Balkansky and Crossier 2009; Swezey 1975), including two features directly adjacent to a residential compound at Teotihuacan (Sheehy 1992, 755–56) and several circular firing features in domestic contexts at Monte Albán (Markens and Martínez López 2009, 140–41, figure 15a). Firing features at sites in Puebla-Tlaxcala that had been excavated into the underlying tepetate—a soil that hardens like bedrock upon exposure to the air (Nimlos 1989; Williams 1972)—are perhaps most similar to those at Ejutla (Balkansky et al. 1997). These firing features resemble the 'pit kilns' in the pottery-making literature in South Asia (Rye 1981; Rye and Evans 1976; Sinopoli 1991), a term that has been applied more broadly beyond South Asia (e.g., Heacock 1995; Rice 1987, 158). They do not have permanent superstructures like the two-chambered updraft kilns at Atzompa and Monte Albán (Payne 1982; Winter and Payne 1976). They also are very different in form and contents from the lime kilns documented at Monte Albán (Ortiz et al. 2021). Those features were constructed with cut blocks of limestone to line the sides of the kiln and flattened stones to form the base and were filled with layers of mud and fragments of lime instead of ceramics.

Three of the pit-firing features at Ejutla (pit kiln 1 in excavation unit 2n34e, pit kiln 2 in 14n30e, and pit kiln 4

Figure 4.17. Broken ceramic vessels in ash near the base of pit kiln 4 (level 17 of 18n24e).

Figure 4.18. All of the ceramics from one 10 cm level in pit kiln 4 (level 17 of 18n24e).

in 18n24e and adjacent units) were excavated completely (Figure 4.19, Figure 4.20, Figure 4.21). All three were slightly asymmetrical, with a narrowing of the bedrock depression at one end into what might have served as a stoke pit, or mouth, to add fuel and ventilate the larger chamber (see Figure 4.1). They varied in size, between 2 and 4 m across and 40 and 70 cm deep. The bases of all three pits were approximately 190 cm below the modern surface.

The basal levels of pit kiln 2 and pit kiln 4 consisted of almost pure ash, often mixed with large potsherds that may have served as spacers or other types of kiln furniture to shield the manufactured vessels from the fuel (Figure 4.22, Figure 4.23, see also Figure 4.17; Peterson 1984, 175). The deposits contained considerable quantities of charcoal, and the bedrock at the base of these features was burnt from repeated firing, accompanied by decomposing pieces of burnt bedrock (Figure 4.24, Figure 4.25).

The bedrock in two of the pit kilns appears to have been modified after initial use. Pit kiln 2 was dug to a second, deeper level while in use (see Figure 4.20). The other two features (pit kiln 3 in 16n34e and pit kiln 5 in 14n36e) were at the edge of the excavation block, and we were unable to excavate more than the western edges of both of them. They were much deeper than the other pit kilns, ~250–260 cm below the modern surface, and although they were only partially exposed, they appear to be two separate, sequential, and partially overlapping pit kilns (Figure 4.26). Pit kiln 5 was in use first (Figure 4.27, Figure 4.28) and then was replaced by pit kiln 3 (Figure 4.29). Both were filled with dark ashy soil, broken pottery, and fire-cracked rocks. These

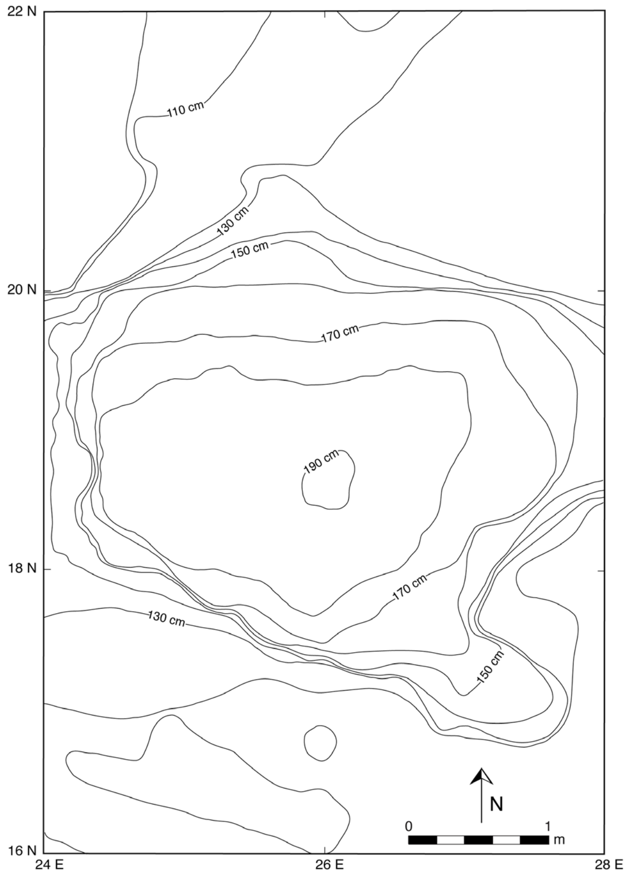

Figure 4.19. Drawing of pit kiln 4 (18n24e).

features were used repeatedly, as evidenced by a dense concentration of broken ceramics and heavy ash in a shallow depression in unit 18n32e just north of pit kiln

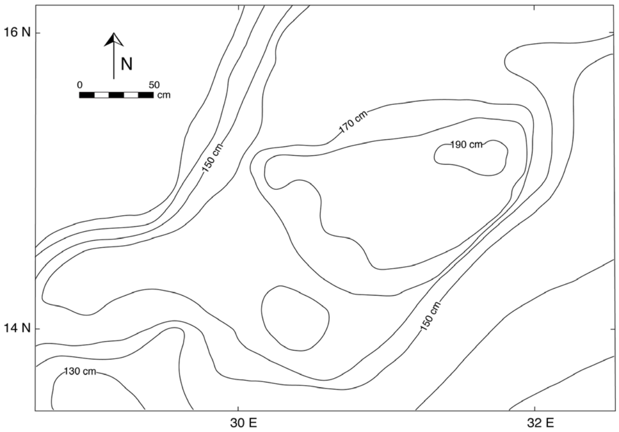

Figure 4.20. Drawing of pit kiln 2 (14n30e).

Figure 4.22. Large broken ceramic vessels and ash on the floor of pit kiln 4 (18n24e).

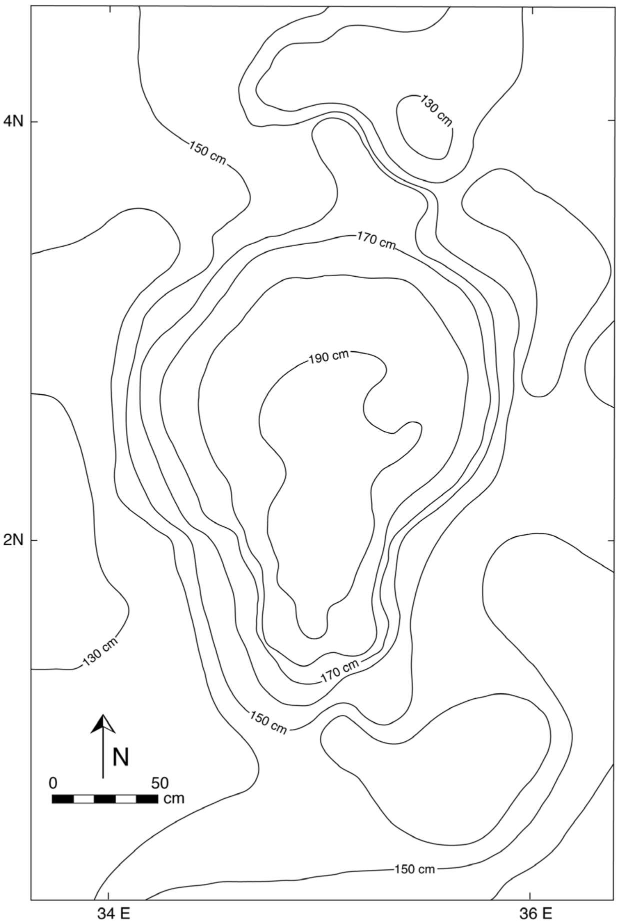

Figure 4.21. Drawing of pit kiln 1 (2n34e).

3 that appears to have been cleaned out of the pit kiln and deposited nearby in preparation for a new episode of firing (Figure 4.30).

The firing feature under the house floor varied in certain key respects from the pit kilns north of the structure (see Figure 4.21). In part, the feature below the house had a different use life, curtailed and truncated by construction of the residential structure, which sealed the pit and led to better preservation. Other variations may relate to slight differences in design. Like the other firing pits, the subfloor feature was carved into the bedrock and contained high densities of ash, wasters, and potsherds. In contrast, though, the subfloor kiln had greater numbers of cobble-sized stones and unusually large pieces of charcoal (Figure 4.31). Many of the cobbles were spalled, covered in soot, and otherwise discolored from burning (Figure 4.32). Some of these stones had been purposefully placed into low spots in the bedrock, defining the edge of the pit-firing depression. This pit kiln also had the best-defined and most distinctive firepit (Figure 4.33). Although the subfloor kiln may have been more formally designed and possibly was built partly of stone, it may simply be better preserved, as construction of the house prevented further perturbation of the feature. In contrast, the other pit kilns appear to have been in use longer, either sequentially or simultaneously, and were subjected to more and greater post-use disturbances.

4.4. Dense Midden with Shell and Other Craft and Utilitarian Debris

The densest midden deposits were in the northwestern part of the excavated area (the north block of units excavated in 1991), north of the structure, where we encountered high concentrations of cut marine shell, broken ceramic vessels, chipped stone tools and debris, and other domestic garbage overlaying pit kiln 4 in 18n24e and adjacent units (Figure 4.34). These dense deposits extended beyond the limits of our excavation to the north and west. The midden with shell debris spread south to pit kiln 2 in unit 14n30e, and although there was much broken pottery in the deposits above the pit kiln, the quantity of shell was lower there (Figure 4.35). Shell debris was very dispersed elsewhere, including in levels above the pit kilns to the east (16n34e [#3] and 14n36e [#5]) and in and above the preserved floors of the house and exterior middens. Shell debris was especially sparse in deposits under the house. A key point is that although these middens were laden with debris from craft activities, those materials were intermixed with

Figure 4.23. Ashy layer filled with broken ceramics in pit kiln 2 (14n30e).

Figure 4.24. Pit kiln 4 (18n24e) completely excavated.

domestic refuse, including ash, animal bone, and broken ceramics that were likely not locally made. The mixing of these different classes of debris in middens proximate to the residence link craft production of several distinct materials with the deposition of refuse from domestic life (Beck and Hill 2004).

4.5. Dating the House and Associated Activities

The bulk of the pottery recovered during the Ejutla excavations comprises gris (gray) and café (brown) paste vessels that typify the Classic period (Monte Albán III–IV; see Table 1.1) ceramic complex in the

Figure 4.25. Pit kiln 2 (14n30e) completely excavated.

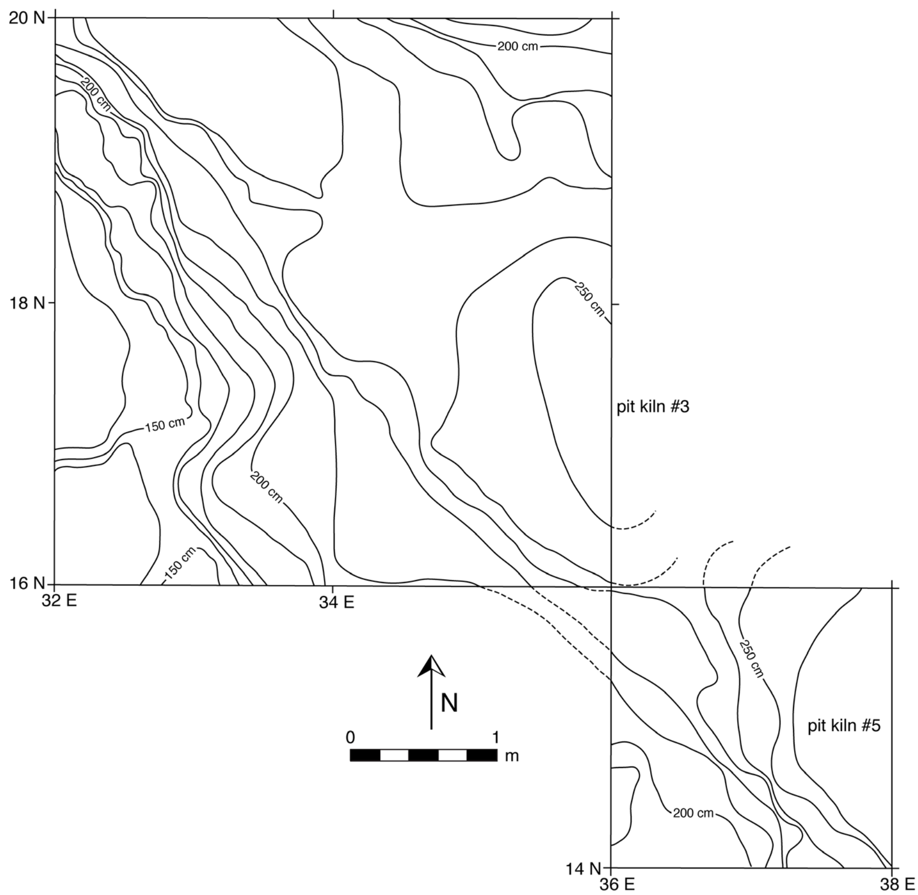

Figure 4.26. Drawing of pit kilns 3 and 5 (16n34e, 14n36e).

Valley of Oaxaca (e.g., Caso et al. 1967; Feinman 2018; Martínez López et al. 2000). These predominant pastes and forms were present in all levels of the excavations, from the upper plow zone to the lowest levels beneath the house. The most common temporally diagnostic ceramics are the ubiquitous plain conical bowls fired in a reducing (low oxygen) atmosphere (G-35s [G for gris]) that date broadly to the Classic period (Figure 4.36;

Figure 4.27. Ceramics in a lower level of pit kiln 5 (14n36e).

Figure 4.28. Base of pit kiln 5 (14n36e).

Figure 4.29. Profile and base of the southern part of pit kiln 3 (16n34e).

Figure 4.30. Dense concentration of broken ceramics and ash in unit 18n32e that was cleaned out of pit kiln 3 and deposited in a nearby shallow depression.

Caso et al. 1967, figures 317, 318, 319; Kowalewski et al. 1978, 178–80); these flat-bottomed, outleaned-wall bowls, often with tripod hollow supports, were found in abundance throughout all levels of the excavations, but their dominance in collections tends to be slightly greater in upper levels in association with the densest middens, including shell debris (Table 4.3). Other gris forms that are more typical of the Late Classic period were present in upper levels but less well represented in the lowest levels. These include gris paste comals (G-35 tortilla griddles) and *molcajetes* (G-1 grater bowls) (Figure 4.37; Kowalewski et al. 1978, 178, 188; Markman 1981, 98–99; Martínez López et al. 2000, lámina 37, figure 65). Also dating to the Late Classic period but present in low numbers are G-1 vessels with appliqued spikes on the exterior surface, mostly receptacles for burning incense (Kowalewski et al. 1978, 180–81), small gris vases with supports or appliques in the form of bat or jaguar/tiger claws (Caso et al. 1967, figure 385, figure 404; Martínez López et al. 2000, figure 28, figure 33, figure 38), and modeled hollow supports in the form of a monkey's head (Figure 4.38). The monkey support from Ejutla is very similar to supports on numerous G-35 bowls at Monte Albán (Caso et al. 1967, figure 318; Martínez López et al. 2000, figure 16, lámina 19).

Earlier graywares in the Valley of Oaxaca ceramic tradition generally have more surface decoration

Figure 4.31. Upper layer of broken pottery and cobble-sized stones in pit kiln 1 (2n34e).

Figure 4.32. Lower level of burnt cobbles and charcoal-filled stoke pit of pit kiln 1 (2n34e).

Figure 4.33. Pit kiln 1 (2n34e) completely excavated.

(Feinman 2018; see also Caso et al. 1967; Kowalewski et al. 1978). Compared to the G-35 bowls, they were present at Ejutla in smaller quantities. These earlier graywares include gris hemispherical and outleaned-wall bowls with carved linear designs on their exteriors (G-23s, Figure 4.39) that are generally thought to date to the Early Classic period (Monte Albán IIIA, Kowalewski et al. 1978, 180), but they likely continued in use in lower frequencies at least until the Middle Classic (ca. 500 CE) in areas far from the center of the Valley of Oaxaca (Feinman and Nicholas 2013, 151). These carved bowls at Ejutla are less typical of the G-23 bowls in Caso, Bernal, and Acosta (1967) and more similar to ones we recovered at El Palmillo that are found in later (Middle Classic period) contexts. Like the plain G-35s, most of these common ceramic vessel varieties were present throughout the excavated levels (see Table 4.3). Other rare ceramics dating to the

Figure 4.34. Dense midden of broken pottery and shell above pit kiln 4 (18n24e and adjacent units).

Figure 4.35. Dense midden of broken ceramic vessels above pit kiln 2 (14n30e).

Early Classic are gris cylindrical vessels with a band of curvilinear carving above the base and large supports with circular applications ('coffee beans' that are likely representations of cacao) that are similar to Teotihuacan-style ceramics (Figure 4.40) (Caso et al. 1967; Markman 1981, 106, plate 17).

The most abundant decorated gris vessels are flat-bottomed serving bowls with one to three thick parallel lines carved just below the interior rim that are referred to as G-12s and G-21s (Figure 4.41, see Table 4.3). The simply decorated G-12 bowls became a common utilitarian vessel in the Valley of Oaxaca during Monte Albán Late I (ca. 300–100 BCE). In Oaxaca, these bowls continued in use into the Early Classic period (e.g., Feinman 2018; T1207, T1241 in Kowalewski et al. 1978, 179). One specific variety of G-12 bowl (T1227) with an everted rim and two wide incised lines under the interior rim is thought to have been

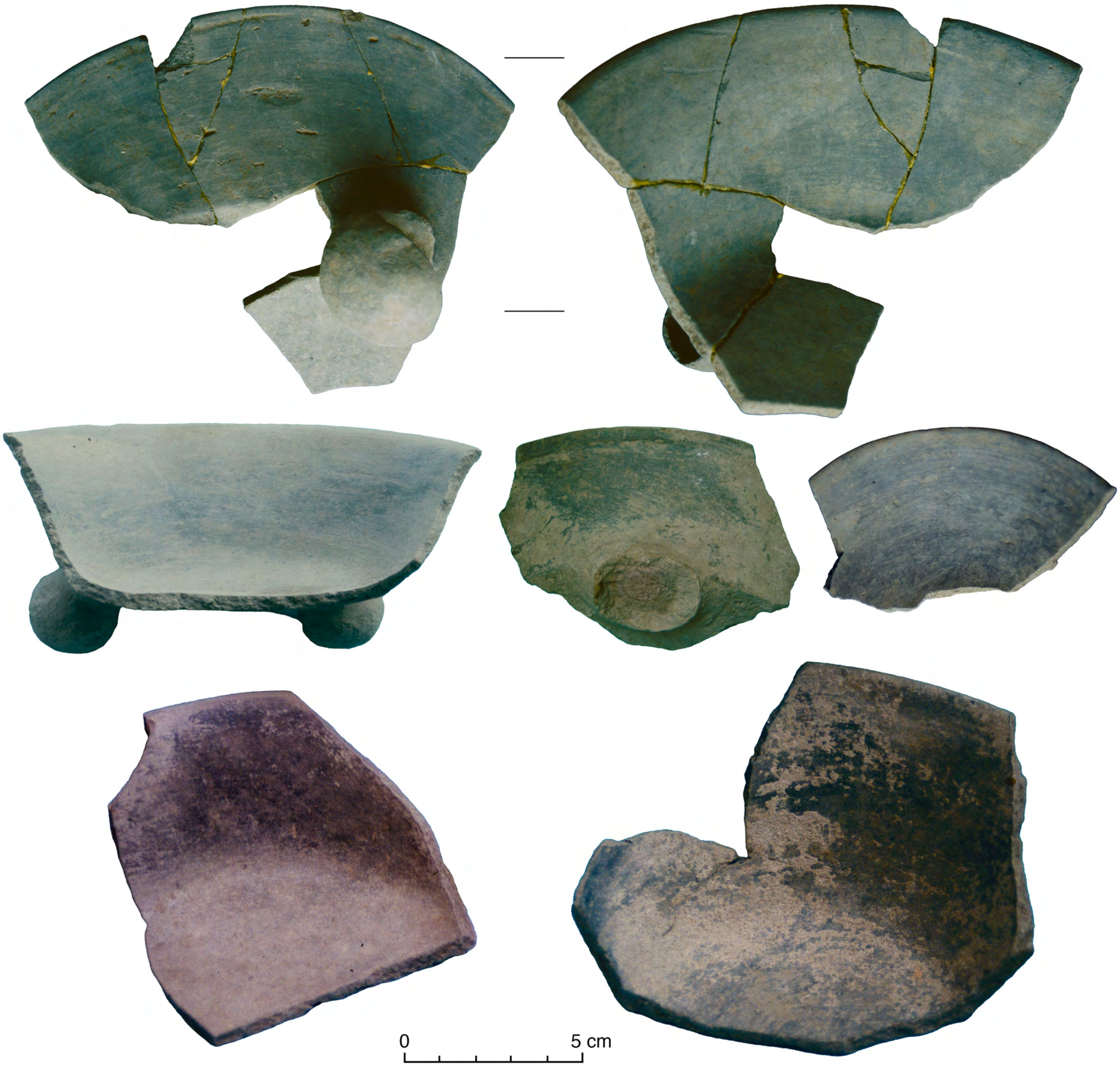

Figure 4.36. G-35 bowls with outleaned walls, some with tripod hollow supports.

used only into Monte Albán II (see Table 4.3; Kowalewski et al. 1978, 179). This particular ceramic variety was most abundant in pit kiln 1 under the house. It also was present in other levels below the house. G-12 bowls with fine-line combed incising on the interior base (T1297) are generally limited in time to Monte Albán Late I (Figure 4.42, see Table 4.3; Kowalewski et al. 1978, 181). These bases were not present in pit kiln 1 but were recovered under the house. Other grayware bowls with fine-line decoration on the rim that are generally more restricted in time to earlier in Monte Albán I were present below the house but extremely rare in our excavations.

In general, café vessels are less temporally diagnostic than gris ceramic varieties. Many café vessels came into use during the Terminal Formative period. One vessel that is common at Ejutla is what we refer to as 'raked ollas,' necked café jars with rough incising or raking on the exterior shoulder (Figure 4.43; Caso et al. 1967, figure 26; Kowalewski et al. 1978, 188). Although they were present throughout the excavated levels, we found them to be, by far, most concentrated in the pit feature and other deposits under the house, similar to the G-12s (see Table 4.3). During later excavations at El Palmillo, we found that raked ollas were similarly restricted to lower levels that largely pertained to the Early Classic period (Feinman and Nicholas 2009). Two other café forms present throughout the excavations were all but absent in the pit below the house: a shallow café *sahumador* (incense burner) with large handles (K-19s) (see Figure 4.11; Martínez López et al. 2000, figure 87, láminas 38 and 39) and various café bowls with blackened surfaces (referred to as 'blackened cafés') (Kowalewski et al. 1978, 191). Like the raked ollas, the blackened cafés were heavily concentrated in levels

Table 4.3. Select temporally diagnostic ceramic varieties from the Ejutla excavations.

Ceramics by count in each general context										
Gris		MA Late I	MA LI–II	MA LI–IIIA	MA II–IIIA	MA IIIA	MA III–IV	MA III–IV	MA V	
Level order	Context	G-12 (T1297)	G-12 (T1227)	G-12 (T1207, T1241)	G-21	G-23	G-1 molcajete	G-35	G-3M	Total gris
0	surface	–	1	6	6	18	1	147	12	191
1	plow zone	–	2	31	5	26	13	78	64	219
2	upper middens	9	4	205	152	118	173	1529	52	2242
3	house & middens	5	11	276	–	78	141	722	16	1249
4	top of 4 kilns	–	2	108	29	31	37	247	–	454
5	base of 4 kilns	1	2	100	32	40	69	467	–	711
6	below house	5	11	277	82	80	121	277	–	853
7	kiln below house	–	12	37	15	8	–	30	–	102
	subtotal	20	45	1040	321	399	555	3497	144	6021

Café		MA Late I	MA I–II	MA II–IIIA	MA I–III	MA II and later	MA III–IV	MA IV–V	MA V	
Level order	Context	K-3	K-8 , K-1, K-19	Raked olla	Blackened café	K-19 sahumador	K-14, comal with shelf	Various	Various	Total café
0	surface	1	39	10	–	–	5	17	5	77
1	plow zone	–	5	9	–	14	1	1	6	36
2	upper midden	30	222	222	53	1004	81	2	37	1651
3	house & middens	28	148	596	209	796	36	27	29	1869
4	top of 4 kilns	14	45	59	17	126	11	9	5	286
5	base of 4 kilns	8	81	122	49	738	37	7	11	1053
6	below house	19	90	1129	346	537	8	23	9	2161
7	kiln below house	1	5	269	2	3	4	1	–	285
	subtotal	101	635	2416	676	3218	183	87	102	7418

Amarillo		MA LI–II	MA II	MA II–IIIA	MA IIIA	MA IIIB–IV	Classic	MA V	
Level order	Context	A-2, A-4	A-9	A-11, Dainzu	A-3, A-8	Imitation Fine Orange	White paste polychrome	Polychrome Huitzo	Total amarillo
0	surface	–	5	2	2	2	5	5	21
1	plow zone	–	2	–	2	7	–	1	12
2	dense midden	14	34	11	28	2	–	12	101
3	house & middens	3	47	11	15	1	–	1	78
4	top of 4 kilns	–	21	2	7	–	–	–	30
5	base of 4 kilns	–	11	1	5	–	2	–	19
6	below house	–	41	1	20	–	1	–	63
7	kiln below house	–	17	1	1	–	–	–	19
	subtotal	17	178	29	80	12	8	19	343

(*Continued*)

Crema		MA Late I	MA I–II	MA I–II	MA II	MA II	
Level order	**Context**	**C-2, C-4, C-5**	**C-1, C-20**	**Other crema**	**C-11, C-12**	**C-6, C-7**	**Total crema**
0	surface	1	2	–	2	1	6
1	plow zone	–	–	–	4	–	4
2	dense midden	1	5	1	17	20	44
3	house & middens	2	3	8	19	27	59
4	top of 4 kilns	2	2	1	5	8	18
5	base of 4 kilns	1	–	3	6	6	16
6	below house	–	3	3	44	28	78
7	kiln below house	–	–	–	1	–	1
	subtotal	7	15	16	98	90	226

Each ceramic variety as percentage of total ceramics in context									
Gris		**MA Late I**	**MA LI–II**	**MA LI–IIIA**	**MA II–IIIA**	**MA IIIA**	**MA III–IV**	**MA III–IV**	**MA V**
Level order	**Context**	**G-12 (T1297)**	**G-12 (T1227)**	**G-12 (T1207, T1241)**	**G-21**	**G-23**	**G-1 molcajete**	**G-35**	**G-3M**
0	surface	–	0.34%	2.03%	2.04%	6.10%	0.34%	49.83%	4.07%
1	plow zone	–	0.74%	11.44%	1.85%	9.59%	4.80%	28.78%	23.62%
2	upper middens	0.22%	0.10%	5.08%	3.74%	2.92%	4.28%	37.87%	1.29%
3	house & middens	0.15%	0.34%	8.48%	–	2.40%	4.33%	22.18%	0.49%
4	top of 4 kilns	–	0.25%	13.71%	3.70%	3.93%	4.70%	31.35%	–
5	base of 4 kilns	0.06%	0.11%	5.56%	1.73%	2.22%	3.84%	25.96%	–
6	below house	0.16%	0.35%	8.78%	2.63%	2.54%	3.84%	8.78%	–
7	kiln below house	–	2.95%	9.09%	3.69%	1.97%	–	7.37%	–

Café		MA Late I	MA I–II	MA II–IIIA	MA I–III	MA II and later	MA III–IV	MA IV–V	MA V
Level order	**Context**	**K-3**	**K-8 , K-1, K-19**	**Raked olla**	**Blackened café**	**K-19 sahumador**	**K-14, comal with shelf**	**Various**	**Various**
0	surface	0.34%	13.22%	3.39%	–	–	1.69%	5.76%	1.69%
1	plow zone	–	1.85%	3.32%	–	5.17%	0.37%	0.37%	2.21%
2	upper midden	0.74%	5.50%	5.50%	1.31%	24.86%	2.01%	0.05%	0.92%
3	house & middens	0.86%	4.55%	18.31%	6.42%	24.45%	1.11%	0.83%	0.89%
4	top of 4 kilns	1.78%	5.71%	7.49%	2.16%	15.99%	1.40%	1.14%	0.63%
5	base of 4 kilns	0.44%	4.50%	6.78%	2.72%	41.02%	2.06%	0.39%	0.61%
6	below house	0.60%	2.85%	35.78%	10.97%	17.02%	0.25%	0.73%	0.29%
7	kiln below house	0.25%	1.23%	66.09%	0.49%	0.74%	0.98%	0.25%	–

Amarillo		MA LI–II	MA II	MA II–IIIA	MA IIIA	MA IIIB–IV	Classic	MA V
Level order	**Context**	**A-2, A-4**	**A-9**	**A-11, Dainzu**	**A-3, A-8**	**Imitation Fine Orange**	**White paste polychrome**	**Polychrome Huitzo**
0	surface	–	1.69%	0.68%	0.68%	0.68%	1.69%	1.69%
1	plow zone	–	0.74%	–	0.74%	2.58%	–	0.37%
2	dense midden	0.35%	0.84%	0.27%	0.69%	0.05%	–	0.30%
3	house & middens	0.09%	1.44%	0.34%	0.46%	0.03%	–	0.03%
4	top of 4 kilns	–	2.66%	0.25%	0.89%	–	–	–
5	base of 4 kilns	–	0.61%	0.06%	0.28%	–	0.11%	–
6	below house	–	1.30%	0.03%	0.63%	–	0.03%	–
7	kiln below house	–	4.18%	0.25%	0.25%	–	–	–

Crema		MA Late I	MA I–II	MA I–II	MA II	MA II
Level order	**Context**	**C2, C4, C5**	**C1, C20**	**Other crema**	**C11, C12**	**C6, C7**
0	surface	0.34%	0.68%	–	0.68%	0.34%
1	plow zone	–	–	–	1.48%	–
2	dense midden	0.02%	0.12%	0.02%	0.42%	0.50%
3	house & middens	0.06%	0.09%	0.25%	0.58%	0.83%
4	top of 4 kilns	0.25%	0.25%	0.13%	0.63%	1.02%
5	base of 4 kilns	0.06%	–	0.17%	0.33%	0.33%
6	below house	–	0.10%	0.10%	1.39%	0.89%
7	kiln below house	–	–	–	0.25%	–

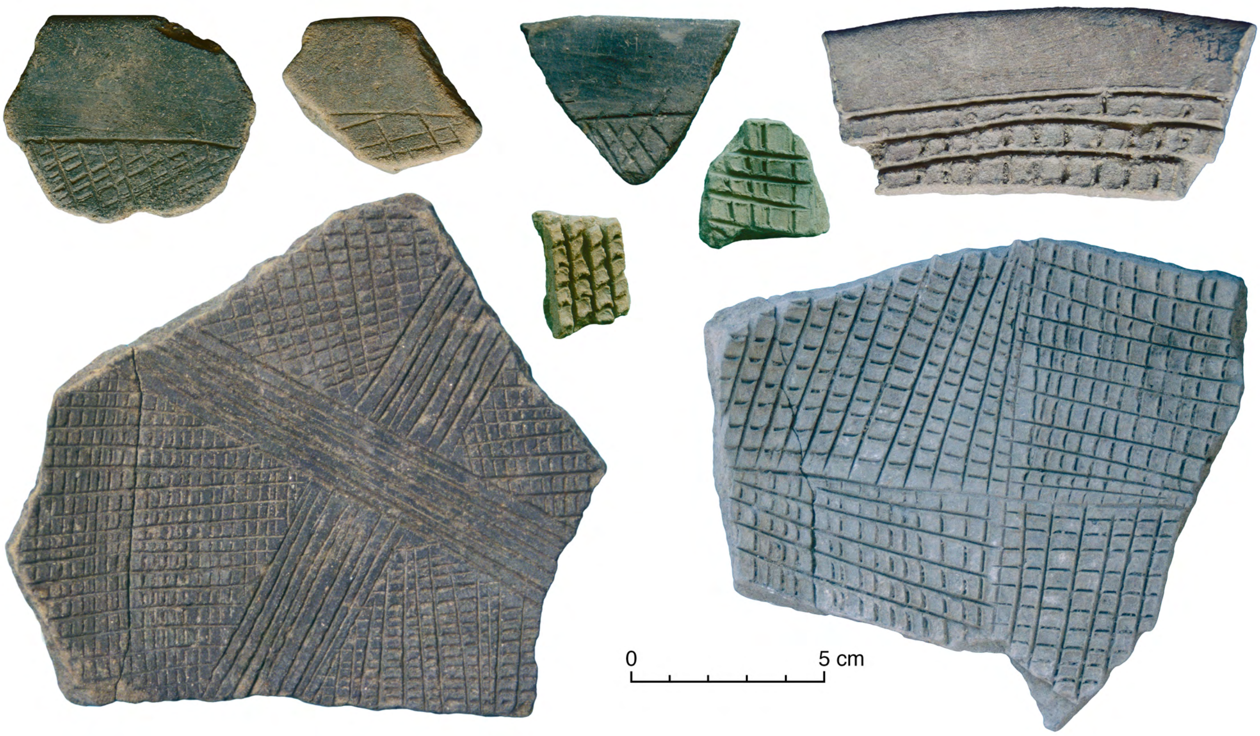

Figure 4.37. G-1 *molcajete* (grater bowl) rims and base fragments.

Figure 4.38. Bat/jaguar claws from small vases (left), a fragment of a large spiked vessel, and a small monkey support (top right).

Figure 4.39. G-23 bowl rims and body fragments with thick-line carving on exterior.

under the house floor (though not in the pit feature), and so they appear to pertain to earlier in the Classic period, as we found at El Palmillo (Feinman and Nicholas 2009). The sahumadors were more abundant in the kilns and upper midden layers (see Table 4.3). There were very few of any of these three vessel types in the plow zone. Other café varieties that are more restricted to the Middle through Terminal Preclassic (e.g., K-1, K-3, K-8, K-19 in Table 4.3, see Caso et al. 1967; Kowalewski et al. 1978, 181–91) were present in low amounts at Ejutla.

Amarillo (an oxidized finer paste with surface colors ranging from tan to orange) ceramics were present in much lower quantities than those of either gris or café paste, and they have more restricted temporal distributions. Most amarillo vessels date to the Terminal Formative and Early Classic periods (Monte Albán II–IIIA; see Table 4.3). In the ceramic complex from the Ejutla excavations, the most common amarillo vessels are convex to cylindrical bowls with red paint on the exterior or interior (A-9s, Figure 4.44; Kowalewski et al. 1978, 192); they date to the Terminal Formative (Monte Albán II) and were present in the greatest concentrations in pit kiln 1 and other levels under the house floor. Other amarillo vessels that date to the Classic period, especially convex to hemispherical bowls with carved exterior designs similar to G-23s or

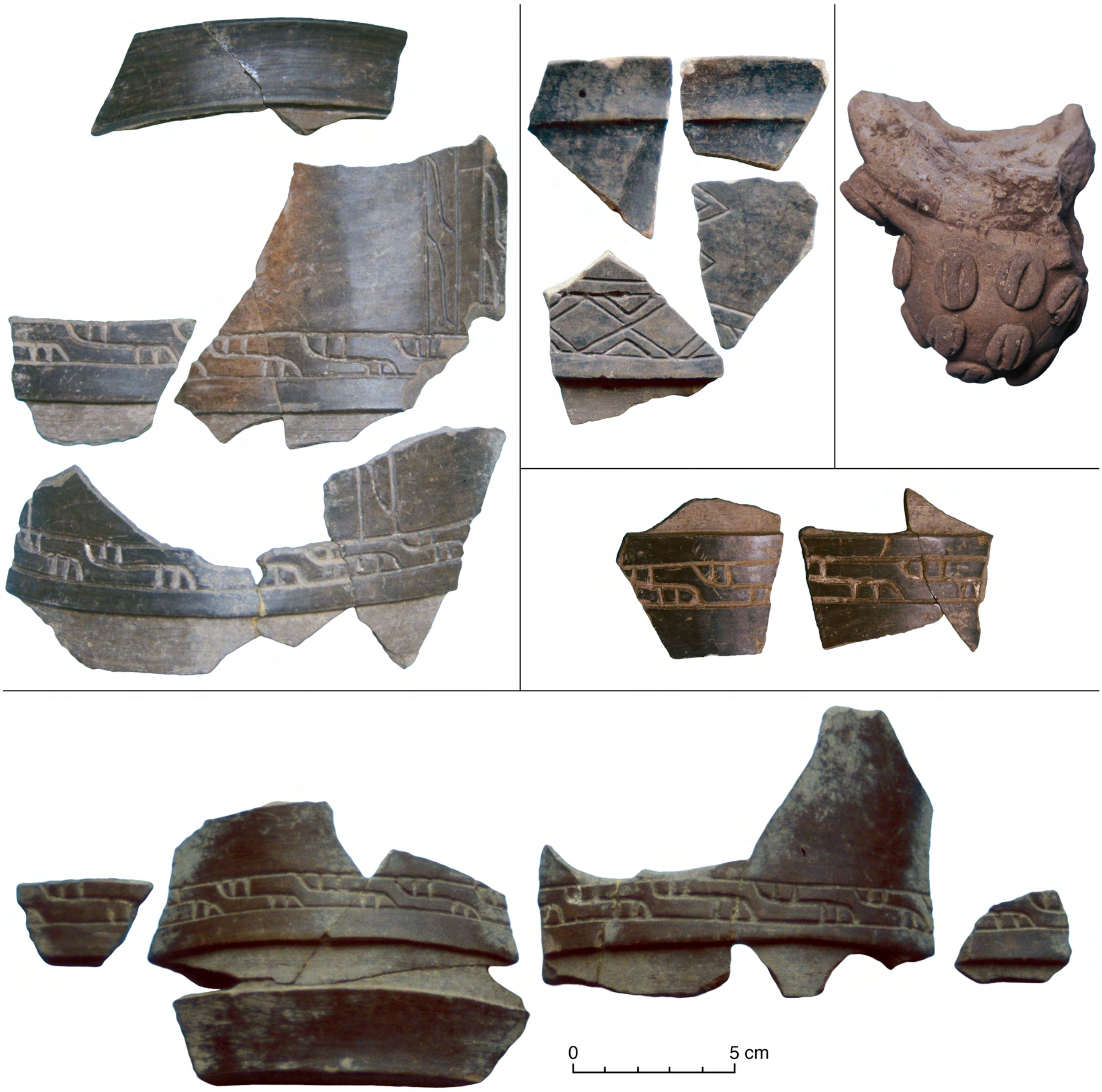

Figure 4.40. Vessels with Teotihuacan-like decorated band and a large support with 'coffee bean' appliques (top right).

A-8s (Figure 4.45; Kowalewski et al. 1978, 192), were present in low frequencies under the house floor and in other contexts.

One variety of thin-walled bowls, usually cylinders and cylindrical bowls, has banded incising or carving on the exterior. These fine-paste vessels, which may be oxidized as amarillos or with gray surfaces, are stylistically similar to Late Classic pottery on the Gulf Coast and other lowland regions to the east. These have been referred to as 'imitation Fine Orange' or Fine Gray wares because they were locally made, albeit with decoration and forms that parallel vessels more typical to the east (Figure 4.46) (Feinman 2018, 320; Kowalewski et al. 1978, 191–92; Martínez López et al. 2000, 218–20). At Ejutla, imitation Fine Orange/Gray sherds were dispersed but more often recovered from plow zone and surface contexts that pertain to late in the Ejutla excavation sequence.

Eight fragments of Classic period polychromes were collected from the surface and dispersed levels in the excavations (Figure 4.47). These white paste sherds generally have curvilinear designs painted in red, orange, and sometimes black that are similar to those from the southern coast or Isthmus of Oaxaca (Joyce et al. 2001; Zeitlin 1993). Another half dozen amarillo body fragments have carved scenes on the exterior like Late Classic Talun-carved pottery from Veracruz and other areas to the east (Figure 4.48; Urcid 1993, figure 26); they are very similar to several carved sherds that we found in the high-status residence on Platform 11 at El Palmillo (Feinman and Nicholas 2007d, 34).

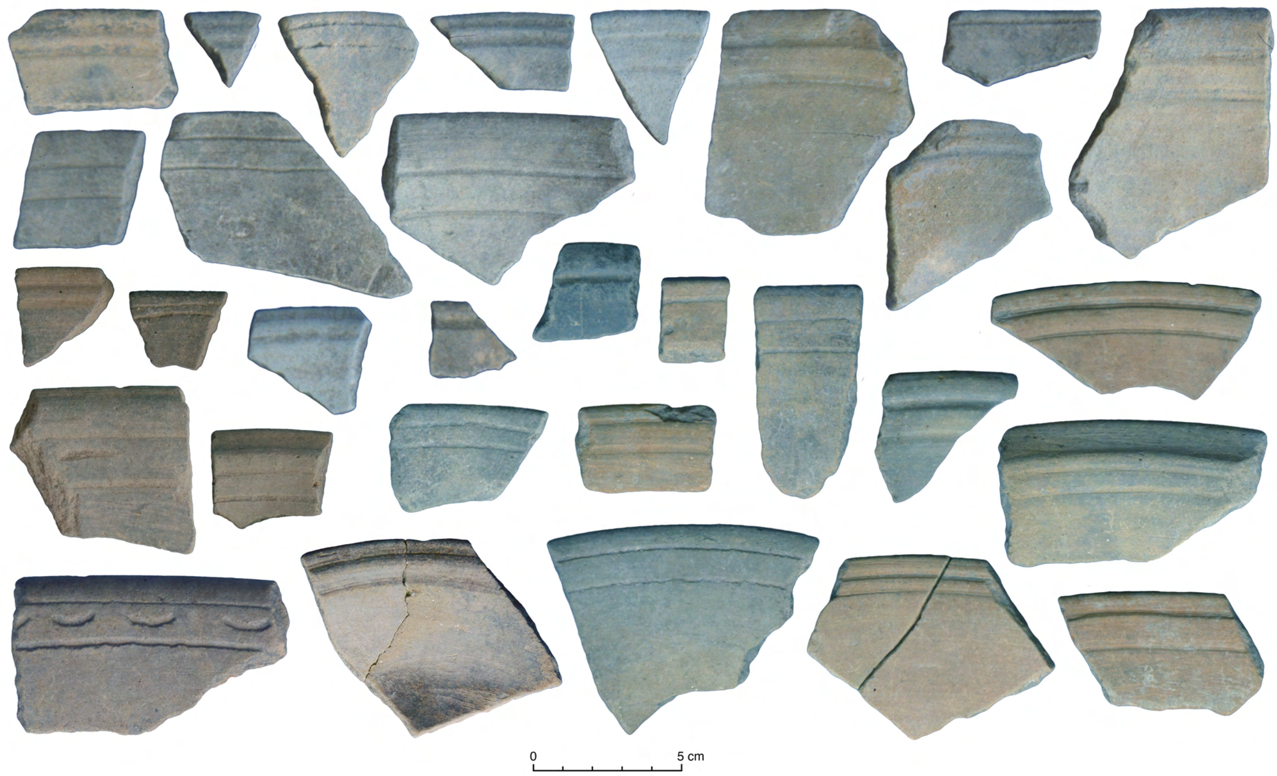

Figure 4.41. G-12 and G-21 bowl rims with parallel carved lines on interior rim.

Figure 4.42. G-12 combed bottoms (below) and possible Monte Albán Early I carved rims (above).

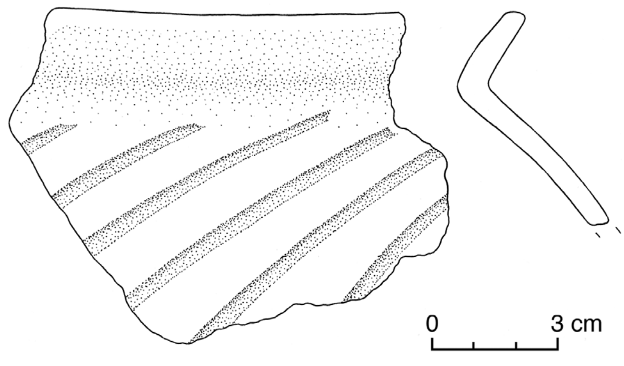

Figure 4.43. Drawing of a café raked olla rim.

Vessels made of crema (cream) paste are the rarest category, less than 0.5% of the ceramic assemblage at Ejutla. Most cremas date to the Formative period (Kowalewski et al. 1978, 170–76), and in our collections, especially to the Terminal Formative (Monte Albán II, 200 BCE–200 CE). Although they were sparsely distributed across some of the midden layers, they were most concentrated in the levels under the house floor. Yet there were few in the pit under the house, and they were likely not made on site. In the Valley of Oaxaca, crema vessels may be undecorated, simply decorated with red or black pigment and lines scratched on the surface post-firing, or highly decorated with bichrome painting (Caso et al. 1967; Kowalewski et al. 1978, 170–76). Most of the cremas at Ejutla are undecorated and very eroded; a few have the typical splotchy red paint and scratched lines (C-7, C-11 in Table 4.3, Figure 4.49).

The Ejutla site was large in the Late Postclassic, with a population exceeding 2000 (Feinman and Nicholas 2013, 165), yet only limited amounts of Postclassic pottery were present in the area of dense surface shell (see Table 4.3). Craft production appears to have ceased in this part of the site toward the end of the residential

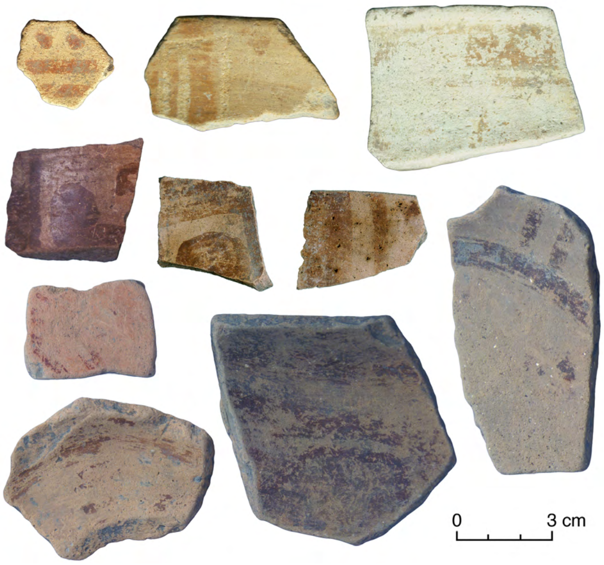

Figure 4.44. Painted A-9 vessel fragments.

occupation documented here. There is no evidence of Late Postclassic residential construction in the area that we investigated. Nevertheless, we did collect a small amount of Late Postclassic pottery. The most common forms were thin-walled, higher-fired, fine-paste gris bowls in a variety of forms (referred to as G-3Ms) (Kowalewski et al. 1978, 177); they were largely constrained to the plow zone and upper disturbed levels. Much rarer, Postclassic polychromes painted with red, orange, and white designs were also sparsely dispersed across the uppermost levels and on the surface of the area excavated (Figure 4.50).

Two other abundant ceramic forms help date the excavated house and pit kilns to the Classic period: mold-made figurines and effigy vessels (funerary urns). Figurines were part of Formative period ceramic assemblages in the Valley of Oaxaca, but those earlier ceramic figures were modeled and generally lack clothing (Feinman and Nicholas 2019b). The earliest mold-made figurines date to

Figure 4.45. Carved amarillo rims and body fragments.

Figure 4.46. Imitation Fine Orange and Fine Gray rims.

the Early Classic period, when these figures began to be represented with clothing (Feinman 2018, 318–20). In the Ejutla middens and kilns there were thousands of fragments of mold-made male and female figures sporting a range of garments. As is typical across the Valley of Oaxaca, most of these figurines were made in café paste (Figure 4.51). We discuss the figurine assemblage in conjunction with the evidence of figurine production in chapter 7.

In the Valley of Oaxaca, effigy vessels became more common during the Early Classic period and increased further in abundance during the Late Classic (Caso and Bernal 1952; Feinman 2018; Marcus 1983a). Earlier effigy vessels tended to have hand-modeled appliques, while mold-made appliques are more typical of the later Classic period in Oaxaca (Feinman 2018, 318). We collected hundreds of urn fragments during the Ejutla excavations, usually in gris paste, comprising a range of forms and mold-made appliques that are typical of Zapotec Classic period effigy vessels, including feathers, glyphs, and *mazorcas* (maize cobs) from headdresses (Figure 4.52), hands, feet, and arms with bracelets (Figure 4.53), and decorated torsos and bases (Figure 4.54) (Caso and Bernal 1952; Paddock 1966, figure 264). We discuss the complete urn that was part of the tomb assemblage in chapter 5.

Although we found a clear pattern that the pit feature and other contexts below the excavated house floor contained many of the Preclassic and Early Classic pottery varieties that we recovered, it is also clear that the domestic area

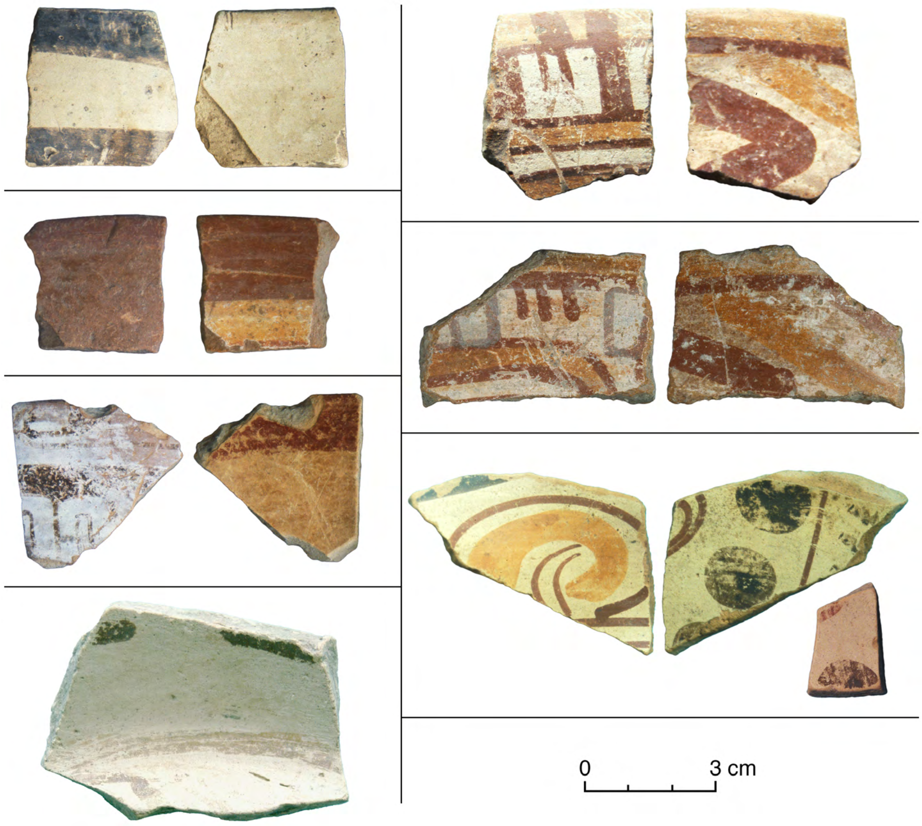

Figure 4.47. Classic period polychromes, showing interior and exterior surfaces and one base fragment.

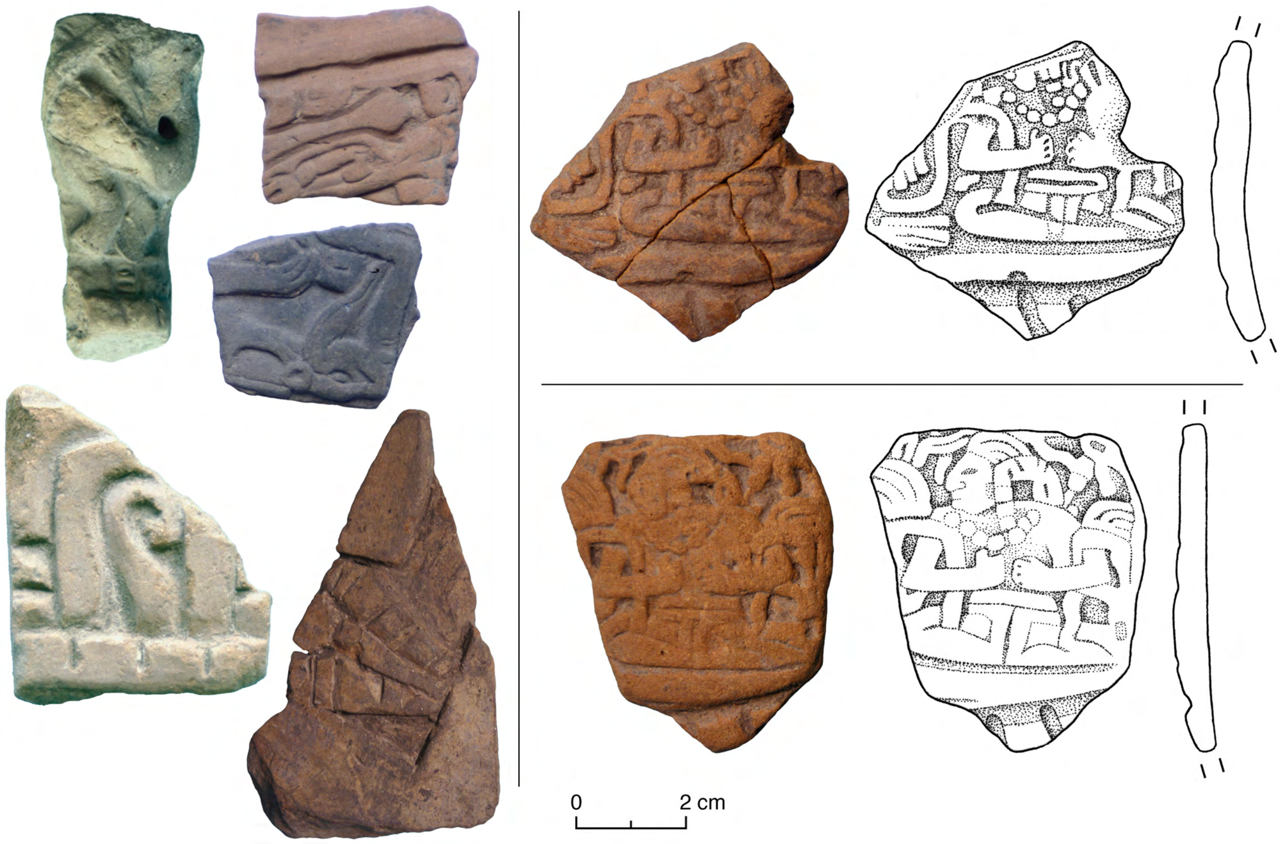

Figure 4.48. Vessel fragments with Talun-like carved scenes.

Figure 4.49. Crema sherds with red paint and post-fire scratching.

Figure 4.50. Postclassic polychromes, including interior and exterior of rim (top left and center) and snake support (bottom right).

exposed during the excavation was continually modified during prehispanic use. Pits were dug and reused, refuse was deposited, and artifactual materials became somewhat mixed. Subsequent, relatively recent post-depositional processes also destroyed and disturbed certain contexts. And yet, the excavations unearthed a Classic period residence that was situated above an earlier ceramic firing feature (so the area was occupied prior to the construction of the house), and the domestic structure itself served as a residence for an extended period. During the course of the excavations, we collected and contextualized charcoal samples for subsequent ^{14}C dating, which allows us to refine the ceramic descriptions and assessments described above.

Here we present and provide our assessment of the ^{14}C dates. Calibrated ^{14}C dates from the residence and the heaviest middens (including the midden with dense cut shell debris) range between cal 430 and 944 CE, with most dates falling within cal 550–800 CE (Appendix 1). These dates support and confirm the ceramic evidence that the residents of the house engaged in shell craftwork during the Middle to Late Classic period. Another important finding from the ^{14}C dating is that the excavated structure was not a short-term or one/two-generation occupation. Rather, the house was occupied for centuries, in the same location, most likely by a multigeneration descendant household unit. The presence of the tomb, which interred minimally four individuals through multiple episodes of interments and offerings, aligns with this interpretation.

Dates from subfloor levels and below the house trend earlier (mostly between cal 430 and 775 CE). The earliest date from the excavations is from the pit (pit kiln 1) below the house (AA-50852, 2 sigma range of cal 266–567

Figure 4.51. Sample of female (top) and warrior (bottom) figurines from the Ejutla excavations.

Figure 4.52. Effigy vessel headdress fragments with feathers, glyphs, and *mazorcas*.

CE, modeled date is *cal 363–576 CE [95.4% hpd]*). The early part of the calibrated range, however, conforms to the chronological placement of the ceramic assemblage associated with the lower levels of the pit kiln to the Terminal Formative/Early Classic (see Table 4.3). Other ^{14}C dates from pit kiln 1 are somewhat later (cal 561–660 CE) and provide evidence of long-term, repeated use (Figure 4.55). As discussed above, we suspect that the upper portion of this feature was truncated when the house foundation was constructed above it.

Figure 4.53. Effigy vessel limb fragments including feet, hands, and arms with bracelets.

Figure 4.54. Effigy vessel torsos, bases, and miscellaneous pieces.

Because of repeated firing and cleaning out of the pit kilns, the specific timing of the construction (and use) of the other pit kilns is harder to determine. Deposits from the base of pit kiln 3 (16n34e) and pit kiln 5 (14n36e) largely date between ca. cal 548 and 700 CE. The other two pit kilns (pit kiln 2 [14n30e] and pit kiln 4 [18n24e]) may have been constructed later; dated samples from pit kiln 2 (14n30e) range between cal 574 and 777 CE, and those from pit kiln 4 (18n24e) between cal 594 and 774 CE. The heavy midden levels associated with and above the two latter pit kilns date between cal 671 and 944 CE. Nevertheless, all of the date ranges associated with these features overlap those for the residential structure. Given the dates, debris, and proximity, there seems little question that the residents of the house used the adjacent pit features.

Based on the ceramics and ^{14}C dates, there were two principal, sequential occupations of the excavated area. The pit under the house was dug into the bedrock at the end of the Terminal Formative or during the Early Classic

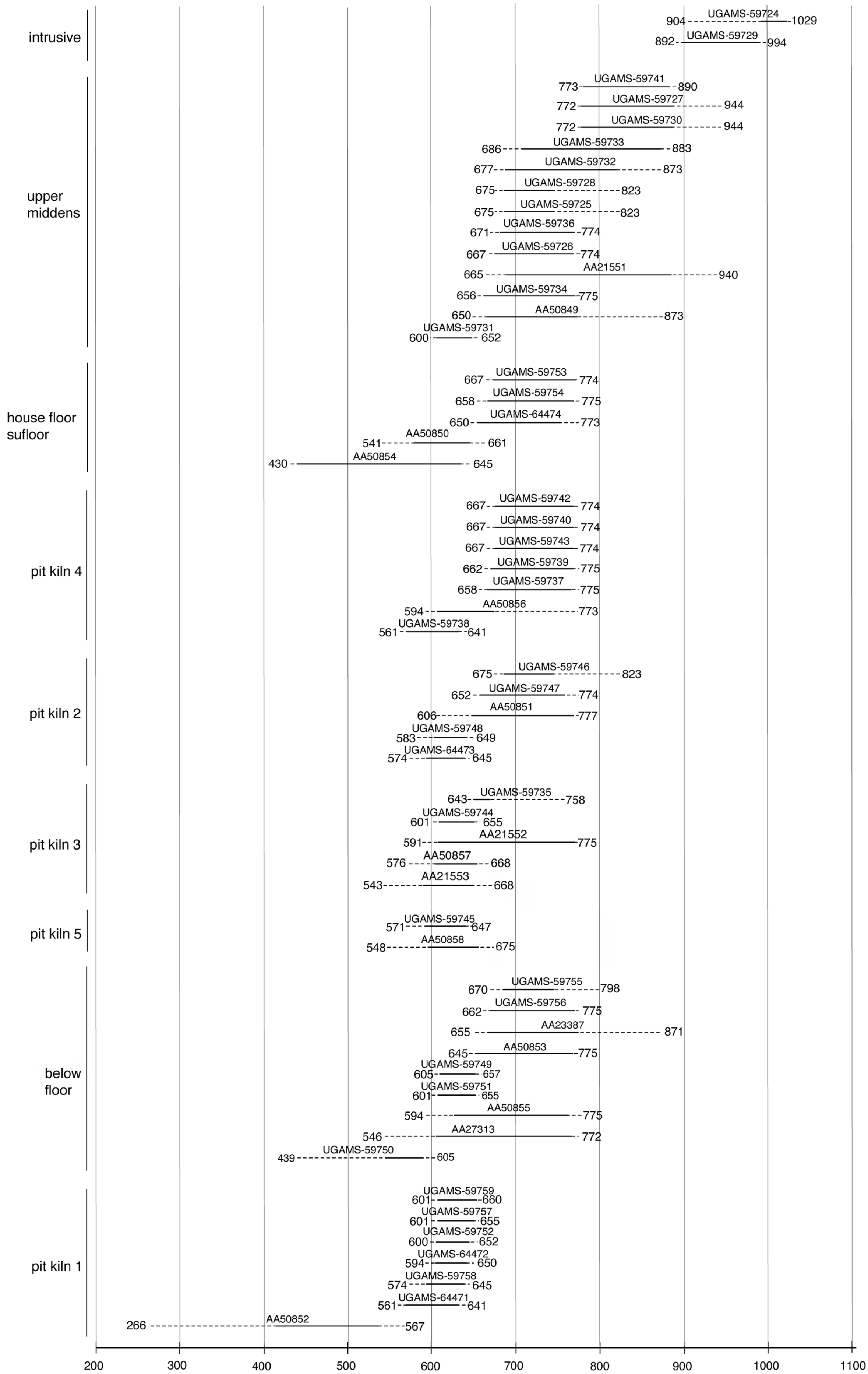

Figure 4.55. Radiocarbon dates for each principal excavated context at Ejutla.

(ca. 250–350 CE) to fire ceramics (see chapter 7). Earlier sherds mixed in with later materials in the surrounding middens could be from other features destroyed when later firing pits were dug into the bedrock. There were no other intact features contemporary with the early pit except for the simple pit burial of a single individual. The top of the burial evidenced some disturbance that occurred prior to the buildup of later midden above it. We suspect the deceased individual lived in a structure that was destroyed by later activities or was situated nearby but beyond the excavated area. Whether or not the other firing pits had been in use earlier is difficult to determine since they would have been continuously cleared out, but at least one other pit kiln (#5) may also have been in use prior to the construction of the house.

Somewhat later the house was constructed above pit kiln 1, truncating the top of the firing pit. The southwestern corner and northern side of the patio were constructed on top of a high ridge of bedrock that slopes down to the north and east. Given the mixture of ceramics from earlier periods in the levels below the house, it seems likely that while the base of the pit was preserved, the top of pit kiln 1 and any other possible features associated with it were destroyed when fill was brought in to provide a flat surface on which to construct the house.

A carbon sample collected near the offering of two ceramic vases placed outside the corner of the east room dates to cal 439–605 CE (UGAMS-59750, see Appendix 1). This offering also seems to situate the initial construction of the house in the Middle Classic period. These paired vases were carved with distinctive imagery that represents the mythological figures ‘1 Tiger’ and ‘2 J’ (Figure 4.56, Appendix 2; Bernal 1947–48, 62; Caso and Bernal 1952, 62–64, 78–81, figures 101, 104; Caso et al. 1967, 326; Martínez López et al. 2000, figure 32; Urcid 2005, figure 2.2). These paired figures are largely considered to date from the middle of the Classic period (Caso et al. 1967, 328).

Figure 4.56. Pair of carved vases: 2 J (top) and 1 Tiger (bottom).

Drawing on the structural remains and chronological information, we have several lines of evidence that place ceramic production activities in this sector of the Ejutla site during the Terminal Formative to the Early Classic. Specialized ceramic production activities have a long history in the region that predates the Ejutla context by centuries (Feinman 1986). The house and the middens containing the dense concentrations of marine shell and other craft and domestic debris were later. They coincided in time with the other outside work areas north of the house, including the firing pits, and were in use during the Middle to Late Classic. Although there may have been movement of specific firing locations as older pit kilns fell into ruin or the spatial needs of the household changed (e.g., Arnold 1991, 54; Rye and Evans 1976, 41, 54, 165–66), multiple pit kilns at Ejutla appear to have been in use contemporaneously. It was during the Middle to Late Classic period that the occupants of the house began to engage in multiple crafts, adding the manufacture of shell ornaments to ceramic production.

The residence and associated craft activities were not short-lived. Rather, the house itself and ceramic manufacture persisted in this location for several centuries, if not longer. The working of marine shell may have been slightly shorter in duration, but the quantity of shell debris (chapter 8) indicates that it too was not an ephemeral or short-duration practice. In chapter 5 we bolster our interpretation that this craftwork took place in a domestic context by presenting the artifactual basis for that assessment.

5

The Material Remnants of Domestic Life

The plan of the structure that we excavated at the Ejutla site conforms with that of other prehispanic Classic period Oaxacan residences. The small patio with a subfloor tomb under one of the rooms is a typical pattern for prehispanic houses in the Valley of Oaxaca at that time (e.g., Feinman et al. 2002a, 2006; Winter 1974, 1995). The simple burial of an individual in a small pit below a midden area near the house also is indicative of a residential context, as are the shallow firepit and probable cooking area in the northwest corner of the structure and the food remains and other residential trash in the middens and work areas that are proximate to the house (e.g., Feinman et al. 2002a, 2006). The mix of craft debris with domestic trash in the middens and the artifacts and raw materials in the house tie its residents to multiple craft activities (shell craftworking, ceramic production, lapidary). The craft activities and firing pits are discussed in chapters 7, 8, and 9. Here we describe the artifact assemblages and other material evidence that confirms the domestic nature of the excavated complex: the contents of the tomb, the simple burial, key characteristics of the ceramic and stone assemblages, subsistence remains, and workspaces inside the house, including the probable kitchen area. Surface remains in the fields south of the excavated area indicate the presence of at least one other similar residence in what appears to have been a barrio of craftworkers at the eastern edge of the Ejutla site.

5.1. The Subfloor Tomb and Its Contents

As we began to expose and excavate the remains inside the small, subfloor tomb (Figure 5.1, see Figure 4.14, Figure 4.15, Figure 4.16), it was immediately apparent that the tomb assemblage was complex, including more than a single individual. At least four people were interred in the tomb—four crania were present (Figure 5.2, Figure 5.3). Two of the bodies were almost entirely in proper anatomical position (Figure 5.4), while the other two individuals and a dog were disarticulated and jumbled in a pile at the head (north end) of the tomb. At this point, we suspected the mortuary assemblage was the result of ongoing reuse of the tomb and not secondary burial (Middleton et al. 1996, 1998). Thus, before removal, all bones were identified and labeled, and their exact provenience was recorded in detailed drawings of the tomb assemblage that were prepared in the field.

The entire mortuary assemblage was analyzed in the field laboratory by William D. Middleton, a member of our crew, who made preliminary sex and age assessments and inventoried and catalogued all disarticulated remains. During the summer following the tomb excavation (1994), the entire assemblage was reexamined with the aid of Guillermo Molina Villegas, a physical anthropologist from the Centro INAH Oaxaca, Instituto Nacional de Antropología e Historia, to confirm and refine all original assessments. Age estimates were based on a combination of pubic symphysis and auricular surface of the ilium (Krogman and Iscan 1986; Lovejoy et al. 1985; Meindl et al. 1985), while sex was based on a combination of cranial and pelvic indices (Krogman and Iscan 1986; White and Folkens 1991). Some relatively minor indications of dietary stress were noted on the skeletal material from the tomb (Middleton et al. 1996).

During the excavation of the tomb assemblage, we labeled the four human crania in the order that they were uncovered (1–4). The skulls of the first individuals interred had been rearranged during later interments, so the skull numbers do not correspond to the order in which the postcranial remains were exposed. The uppermost body is numbered as Individual 3, a gracile male approximately 29–30 years of age who was positioned on top of Individual 2. Individual 3's body was sprawled, with both legs flexed and resting on the sides of the tomb, and his neck and cranium were rotated upward toward the west side of the tomb (Figure 5.5). Collapse of the roof had slightly disarranged the right half of his pelvis. His only malady was dental caries.

Individual 2 was a robust female approximately 30–34 years of age; her body was extended on the floor of the tomb, and most skeletal elements were in their proper anatomical position (Figure 5.6). Only the pelvis, abdominal area, and left fibula were slightly disturbed. She had periostitis on her right humerus and femur as well as arthritis in both hands and feet and vertebrae. Individual 2 had several dental caries and abscesses. Individual 1 was a very robust male of approximately 35–40 years of age, whose postcranial remains were completely disarticulated in the pile of bones at the head of the tomb (Figure 5.7). Most of the individual's skeletal elements were present, and we were able to identify them as belonging to this individual on the basis of their size and robusticity. Individual 1 had periostitis on his left fibula and arthritis in his feet. His mandibular molars showed extensive wear. Individual 4 was a child of approximately 5 years of age. The child's remains were very fragmentary (cranium and long bones) and mixed in with those of Individual 1 in the pile of bones at the head of the tomb.

The sequence of interment in the tomb was decipherable. Individuals 1 and 4 were the first to be placed in the

Figure 5.1. The subfloor tomb at Ejutla, including a large stone from the collapsed roof and ceramic offerings.

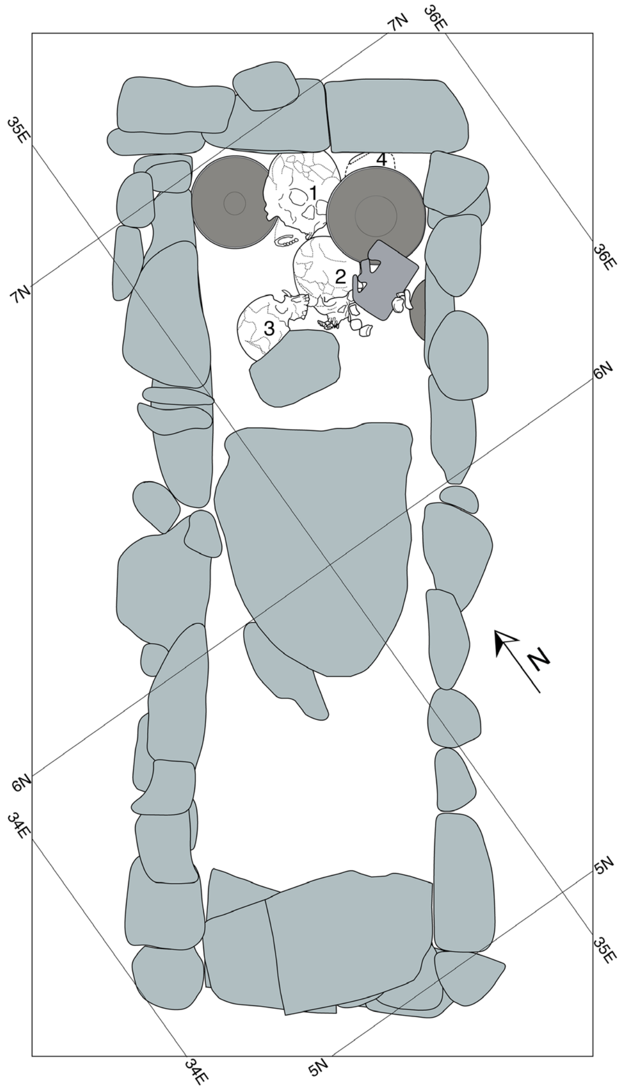

Figure 5.2. Drawing of tomb contents, showing four crania and four ceramic offerings.

tomb, along with the dog. Their soft tissue had decayed completely by the time Individual 2 was buried, at which time their remains were pushed to the head of the tomb to make room for the new interment, and the cranium of Individual 1 was carefully placed on top of the pile of disarticulated bones. The remains of Individuals 1 and 4 were so jumbled that it was not possible to determine which body was interred first, but most likely the adult was the first occupant or they were entombed together. The final burial was Individual 3. Given the minimal disturbance of Individual 2 and the awkward position of Individual 3, it would appear that a shorter time elapsed between the two final burials and that Individual 2 had not decomposed sufficiently for its remains to be pushed toward the head of the tomb when it was reopened for the final burial. Nevertheless, the decomposition of Individual 2's remains was sufficiently advanced that the interment of Individual 3 caused some disturbance, especially to the chest and abdominal area of Individual 2.

Once the loose teeth and smaller bones (carpals, tarsals, phalanges) from the jumbled bones at the head of the tomb had been identified, sorted, and added to those recovered in situ, it was apparent that there were several redundant elements that did not belong to any of the identified individuals, that is, the total number of elements exceeded a minimum number of four individuals. These redundancies, including a left lower third premolar, a left lower first molar, a right second metacarpal, a left fifth metatarsal, and a left cuboid, all of adult size, indicate that at least one additional adult was interred in the tomb (Middleton et al. 1996, 1998). None of the disarticulated bones in the tomb were modified in a manner to support secondary use or interment, and we suspect these redundant elements are the sole remnants of the primary burial of one or more individuals whose remains were largely removed prior to the placement of Individuals 1 and 4 in the tomb. It seems likely that when the bones of the first tomb occupant were moved, these small elements remained, perhaps buried in the earthen floor of the tomb. The few small bones from an earlier interment do not reflect a typical secondary burial assemblage, and so we suspect that they were small fragments of a skeletal assemblage that was left behind in the tomb. The condition and completeness of the remains of

Figure 5.3. Ceramic offerings, including a small effigy vessel, and multiple human crania in the subfloor tomb.

Figure 5.4. The last two interments in the tomb.

Individual 1 also indicate that, although he was completely disarticulated, he was in his primary burial place.

The skeletal remains from the individual (or individuals) that preceded Individuals 1 and 4 in the tomb were most likely discarded near the dwelling. In extramural midden contexts near the excavated house, we recovered more than 100 human teeth, bones, and bone fragments representing virtually all adult skeletal elements. Together with the redundant elements in the tomb, a conservative estimate is that they pertain to one or two individuals. Consequently, at least five individuals were buried in the tomb in a more or less serial fashion, with the skeletal remains of earlier burials pushed aside to make room for the newly deceased (Middleton et al. 1996, 1998). Awareness of ongoing tomb use and reuse was not widespread at the time of our excavations. Disturbed or disarticulated primary burials in tombs often were identified as secondary burials (e.g., Romano 1974, 96). Yet ongoing tomb use had been recognized in several instances in Oaxaca (Acosta and Romero 1992; Flannery 1983a; Lind and Urcid 1983; Paddock et al. 1968) and the Oaxaca barrio in Teotihuacan (Sempowski and Spence 1994, 133–34). Middleton et al. (1996, 1998) proposed ongoing tomb use to explain the distribution of skeletal remains in Tomb 7 at Monte Albán (see also Jansen and Pérez Jiménez 2017), and we subsequently documented the serial reuse of four Classic period tombs that we excavated at El Palmillo (Feinman and Nicholas 2009; Feinman et al. 2006).

Intermixed in the pile of bones at the head of the tomb were the largely complete remains of a small adult dog (Figure 5.8). In prehispanic Oaxaca, dogs were common offerings in human burials, from simple graves to elaborate tombs (Duncan et al. 2008; Feinman et al. 2008, 180; Flannery 1983b; Lapham et al. 2013, 2023; Lind and Urcid 2010, 222; Winter et al. 1995, 37, 51; Zárate Morán 1992). These offerings reflect the widespread Mesoamerican belief that dogs guided the dead across the river that led to the Underworld (e.g., Sahagún 1952, 41–42; Starr 1900, 27).

The offerings in the tomb were modest. In addition to the dog, a small effigy vessel and four undecorated ceramic bowls were placed at the head of the tomb in association with the four crania (see Figure 5.2, Figure 5.3, Appendix 2). Even though the occupants of this house crafted shell ornaments, only one small shell bead (*Chama* sp., <0.5 cm diameter) was placed in the tomb, next to the pelvis of Individual 2 (see Figure 5.6). The ceramic effigy vessel

Figure 5.5. Drawing of the flexed body of Individual 3 and a broken ceramic bowl below his shoulder.

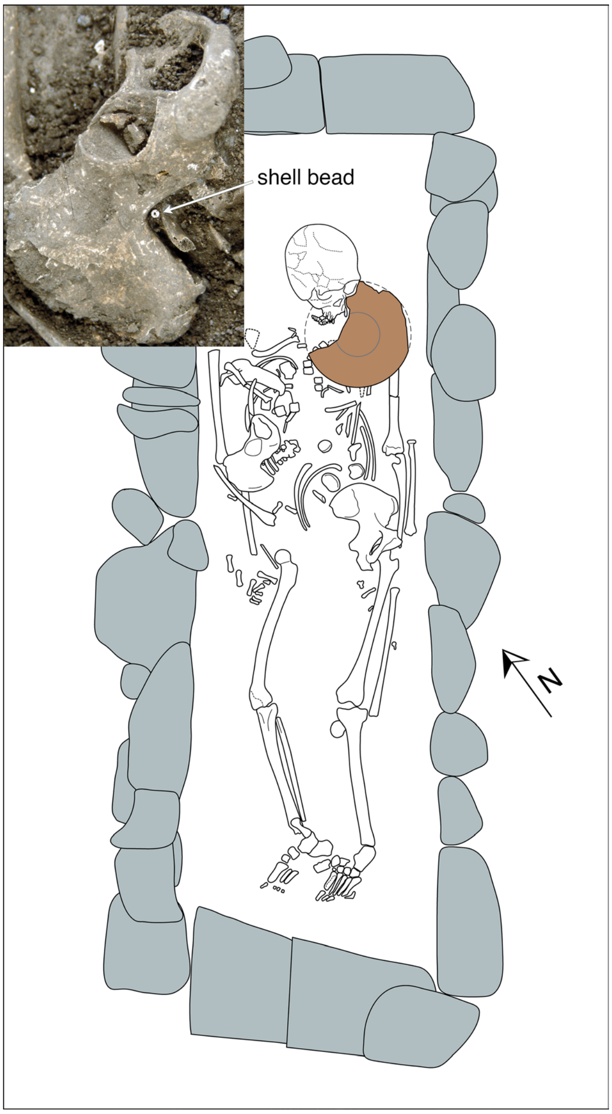

Figure 5.6. Drawing of Individual 2 with a broken ceramic bowl above her left shoulder: a small shell bead next to the pelvis is visible in the inset photo.

is fairly typical, if small. This grayware Classic period funerary vessel portrays a seated individual wearing a mask of Cocijo (Figure 5.9), the Zapotec supernatural associated with lightning (e.g., Marcus 1983a; Marcus and Flannery 1996, 159). Although the effigy vessel is smaller and less elaborately adorned than many Classic period funerary urns in the Valley of Oaxaca, it presents many key characteristics of Zapotec funerary vessels (e.g., Bernal 1947–48; Caso and Bernal 1952; Paddock 1966; Paddock et al. 1968; Saville 1904). The individual sits with crossed legs, hands on its knees, and wears a short cape over an undecorated loincloth. The headdress of the figure is adorned with a large glyph C applique, and the individual is bejeweled with bracelets on both arms, large earspools, and a necklace of large beads. As with many Zapotec funerary vessels, a hollow cylinder forms the back of the effigy object.

Three of the other vessels were complete. Like the effigy vessel, they all were made in gris paste and, although undecorated, have burnished black surfaces (see Appendix 2). The vessel under the effigy was a large shallow bowl or plate with a rim diameter of 24 cm (Figure 5.10 top). In the corner of the tomb, partially positioned under the crania of Individual 1, was an outleaned-wall bowl with a rounded bottom and rim diameter of 22 cm (Figure 5.10 bottom). The third vessel, a shallow outleaned-wall bowl, was placed against the tomb wall near the effigy vessel. It is smaller than the other two, with a rim diameter of 15 cm (Figure 5.10 center). The three gris bowls are typical of vessel forms found in a range of Classic period contexts in the Valley of Oaxaca, including offerings, burials, and other domestic contexts. In contrast to the effigy and other complete vessels, the fourth ceramic object was partial and so poorly preserved that it could not be reconstructed (see

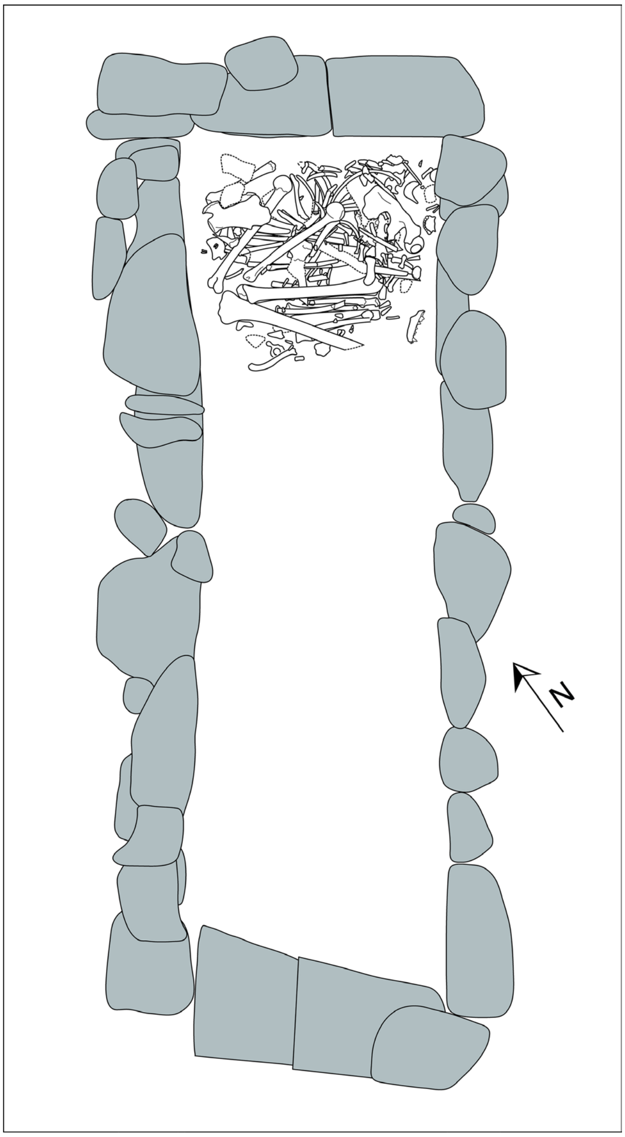

Figure 5.7. Drawing of the bones of Individual 1 and Individual 4 jumbled together at the head of the tomb.

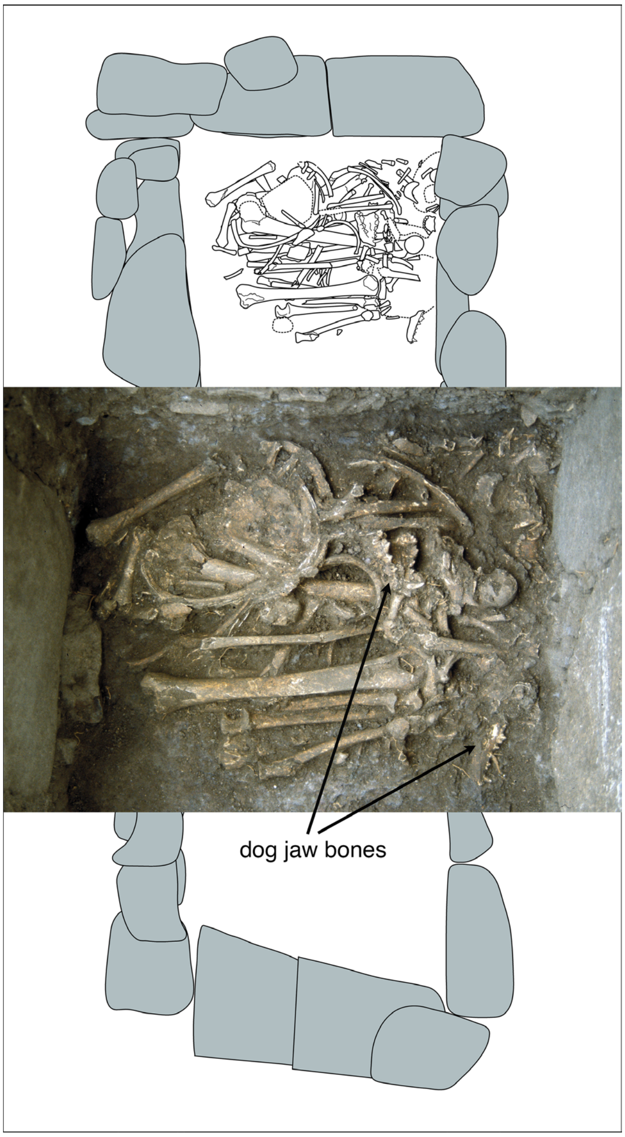

Figure 5.8. Piled bones of Individuals 1 and 4 and a small dog (jaw bones labeled) at the head of the tomb.

Figure 5.6). We found similar poorly preserved vessels made of a soft, low-fired café paste in a subfloor tomb at El Palmillo (Feinman and Nicholas 2008, 34), as did Paddock (Paddock et al. 1968) in tomb contexts at Lambityeco, in the eastern arm of the Valley of Oaxaca. Such low-fired café paste vessels are rare and largely restricted to burial contexts. Given their fragility, they appear to have been made specifically for that purpose.

Given the placement of the offerings, we suspect that they were positioned in the tomb after the last interment. But since the tomb was entered multiple times, it is not possible to tie specific grave offerings to particular individuals. Yet at least two of the vessels were likely in the tomb prior to the last interment. The skull of Individual 1, which was disturbed by the burial of Individual 2, was positioned above the outleaned-wall bowl (22 cm rim diameter) in the corner, and the partial café bowl was placed above the left shoulder of Individual 2 and below the last interment (Individual 3). The dog remains were mixed with the bones of the first two burials (Individuals 1 and 4) piled at the head of tomb. Its final positioning there indicates that it likely accompanied an early interment.

The modesty of the funerary offerings in the tomb aligns with our earlier assessment that this household was not of especially high status. And yet, based on the presence of the tomb, along with the relative size of the house and mode of construction (foundation of finished and roughly finished stones rather than rough cobbles), neither were the residents of this household at the base of the socioeconomic hierarchy (see chapter 4). The relative health of the individuals interred in the tomb accords with this assessment.

Figure 5.9. Small effigy vessel with Cocijo imagery from the tomb.

Figure 5.10. Three complete ceramic vessels from the tomb, all in gris paste: large shallow bowl or plate (top); small shallow outleaned-wall bowl (center), and outleaned-wall bowl (bottom).

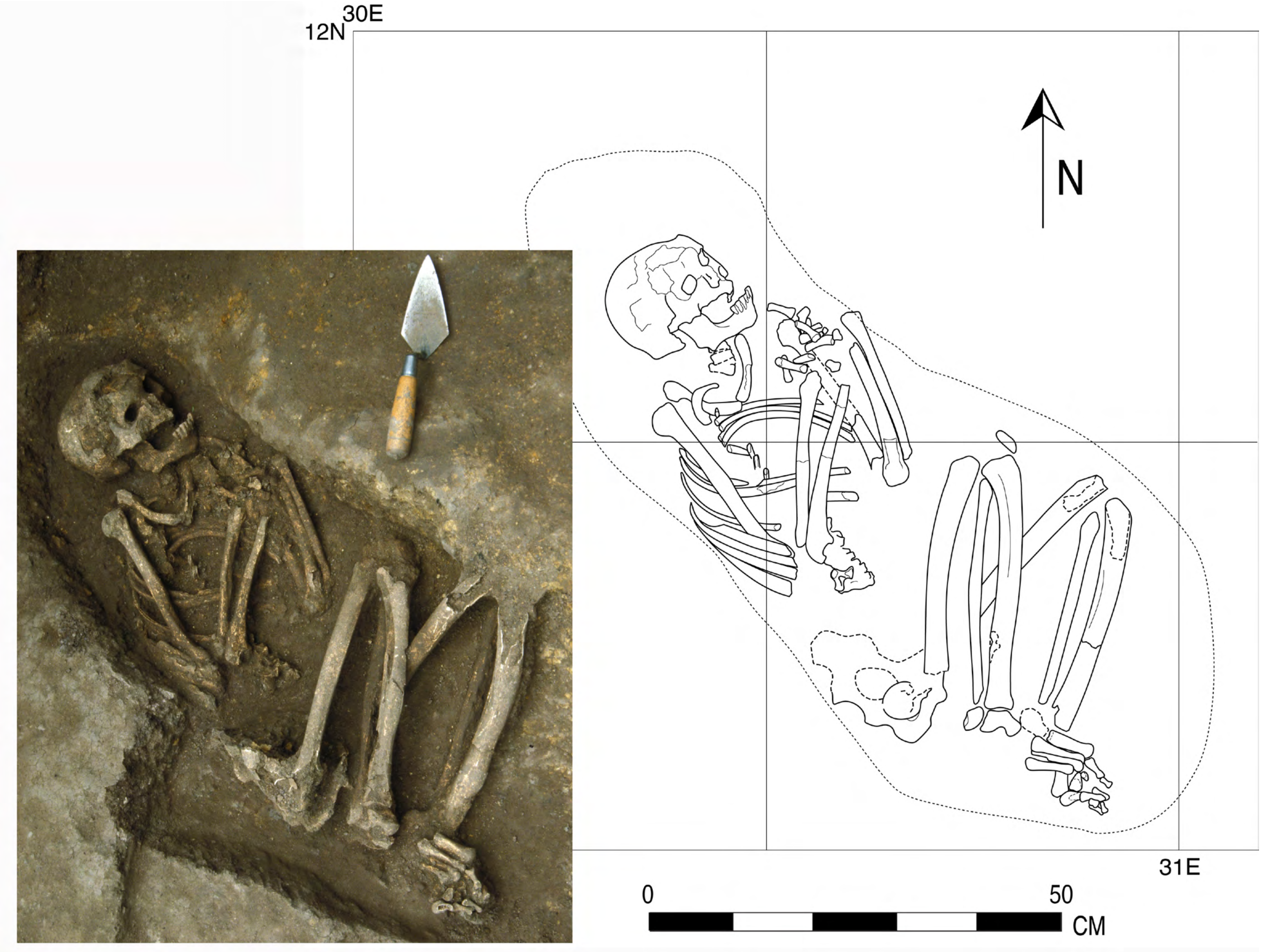

Figure 5.11. Simple pit burial (Feature 3) of an adult female under midden north of the structure.

5.2. Feature 3 Burial

The individual interred in the pit grave was an adult female laid on her left side with her knees flexed (Figure 5.11). The skeletal remains were largely complete, and the skull was well enough preserved to see that the individual had undergone oblique tabular cranial deformation. Several maladies include an infection (likely osteomyelitis) on the left tibia, an infection in the nasal cavity, and heavy wear and caries on several molars. Scars on the mandible show healing from prior trauma. As there were no grave offerings with the body, this individual may have been afforded lesser personal standing or status than the individuals interred in the tomb.

5.3. The Domestic Assemblage at Ejutla

5.3.1. Ceramics

The large midden north of the structure contained more than cut shell debris. It also was filled with residential trash including huge amounts of broken utilitarian pottery, stone tools and chipping debris, and animal bones. Domestic trash also was abundant in fill contexts under the structure, in exterior areas around the house, and in all the pit kilns. After the kilns served as firing features, refuse was deposited in them.

By quantity and volume, ceramic remains are the most abundant material that we collected during the excavations. These remains are heavily dominated by gris (gray) and café (brown) plainware vessels that are typical of the Classic period (ca. 250–900 CE) in the Valley of Oaxaca (e.g., Caso et al. 1967; Feinman 2018; Kowalewski et al. 1978). Overall, the Ejutla assemblage is generically similar to the Classic period contexts at the three sites—El Palmillo, Lambityeco, and the Mitla Fortress—we later excavated in the eastern arm of the valley (Feinman and Nicholas 2009, 2011b, 2016b). These two paste categories comprise approximately 95% of the utilitarian pottery at Ejutla, with roughly twice as much grayware as café. The proportions vary slightly between the later occupation (associated with the structure) and the earlier one below the house: ~37% café in the lower levels and ~32% in the later levels (Table 5.1). This decline is similar to changes over time in the ceramic assemblages at El Palmillo and the Mitla Fortress (Feinman and Nicholas 2009, table 4b, 2011b, table 5a); across the entire Valley of Oaxaca, gris paste vessels increased slightly as a proportion of all ceramic wares during the Classic period (Feinman 2018).

Table 5.1. All ceramics at Ejutla by paste for each general context*.

Context**	Gris	Café	Amarillo	Crema	Total for context
surface	3080	1172	242	35	4529
plow zone	3374	906	228	19	4527
upper midden	38763	17883	2431	116	59193
house & middens	35514	18527	1841	180	56062
top of 4 kilns	5666	3351	237	33	9287
base of kilns	10857	6691	345	23	17916
below house	28960	17213	2461	341	48975
kiln below house	773	1177	267	10	2227
total for paste	126987	66920	8052	757	202716

Percentage of each paste in each general context

Context	Gris	Café	Amarillo	Crema	Total
surface	68.01%	25.88%	5.34%	0.77%	100%
plow zone	74.53%	20.01%	5.04%	0.42%	100%
upper midden	65.49%	30.21%	4.11%	0.20%	100%
house & middens	63.35%	33.05%	3.28%	0.32%	100%
top of 4 kilns	61.01%	36.08%	2.55%	0.36%	100%
base of kilns	60.60%	37.35%	1.93%	0.13%	100%
below house	59.13%	35.15%	5.03%	0.70%	100%
kiln below house	34.71%	52.85%	11.99%	0.45%	100%

* includes all ceramics in the assemblage, including nondiagnostic bodies, but not concretions, unknown paste, or sherds from mixed deposits.

** listed in order from highest level to lowest level; see Figure 4.55.

Nondiagnostic body fragments were abundant in our collections. They accounted for almost three-quarters of the vessel fragments that we counted and weighed. It was not possible to refit most of these pieces. The remaining 25% (~55,000 sherds) includes rims, handles, supports, bases, and other miscellaneous or decorated sherds that were distinctive and/or large enough to determine their form, or they were temporally diagnostic. We base our descriptions and analyses on this smaller component of the ceramic assemblage, which contains all the basic vessel forms that typically are found in domestic contexts in the Valley of Oaxaca.

Bowls are the dominant vessel form (approximately 60% of the assemblage), of which almost 80% are gris (Table 5.2). Most of the bowls at Ejutla, like those in the subfloor tomb, are undecorated (see Figure 5.10). The drab, utilitarian G-35 conical bowls, with outleaned walls and either direct or flared rims, that are ubiquitous at Classic period sites in the Valley of Oaxaca are also the most common vessel form in the domestic assemblage at Ejutla (Table 5.3, see Figure 4.36, Table 4.3). Their size is variable, mostly around 20–26 cm in diameter, but some are as large as 40 cm (Appendix 3). Another common utilitarian gris vessel form are shallow outleaned bowls with flat bases (Figure 5.12); they tend to be smaller than the conical bowls. Other gris bowl forms are present in lower quantities, including hemispherical bowls (Figure 5.13), cylinders, cylindrical bowls (Figure 5.14), plates (see Figure 5.10 top), and large basins, some as large as 74 cm in diameter (Appendix 3). These Classic period vessels generally have no decoration beyond streaky or black burnishing, and some have small solid supports or larger hollow supports (see Figure 4.36). A small proportion of bowls (approximately 15%) were made of café paste, usually with outleaned or shallow outleaned walls (Figure 5.15). Ceramic bowls also range in size from small and miniature ones, generally smaller than 10 cm in diameter (Figure 5.16) to large serving vessels (Figure 5.17). Some of the largest vessels are café basins (Figure 5.18). The gris and café basins are unlike other large serving vessels and may have been used for other, unknown purposes.

Approximately 25% of the utilitarian vessels in the assemblage are jars. In contrast to bowls, more than half of the jars were made in café paste. Large, coarse-paste jars for storage and cooking are abundant in both pastes,

Table 5.2. Vessel forms at Ejutla by paste*.

Paste	Bowls	Jars	Comals	Sahumadors	Figurines	Urns	Total
amarillo	2053	239	–	–	8	4	2304
crema	231	38	21	–	–	–	290
gris	24531	5356	98	72	77	166	30300
café	4804	6202	4680	3284	1918	118	21006
total	31619	11835	4799	3356	2003	288	53900

Percentage of each vessel form that was made from each paste

Paste	Bowls	Jars	Comals	Sahumadors	Figurines	Urns
amarillo	6.49%	2.02%	–	–	0.40%	1.39%
crema	0.73%	0.32%	0.44%	–	–	–
gris	77.58%	45.26%	2.04%	2.15%	3.84%	57.64%
café	15.19%	52.40%	97.52%	97.85%	95.76%	40.97%
total	100%	100%	100%	100%	100%	100%

Percentage of each paste that was used to make each ceramic form

Paste	Bowls	Jars	Comals	Sahumadors	Figurines	Urns	Total
amarillo	89.11%	10.37%	–	–	0.35%	0.17%	100%
crema	79.66%	13.10%	7.24%	–	–	–	100%
gris	80.96%	17.68%	0.32%	0.24%	0.25%	0.55%	100%
café	22.87%	29.52%	22.28%	15.63%	9.13%	0.56%	100%

* does not include nondiagnostic bodies.

Table 5.3. Ceramic forms by paste for sample of rims with measured diameters*.

General form	Specific form	Amarillo	Crema	Gris	Café	Total
basin	–	–	–	43	11	54
bottle	–	–	–	6	–	6
bowl	composite silhouette	1	–	2	–	3
bowl	cylindrical	3	–	15	–	18
bowl	flared rim	2	–	4	2	8
bowl	hemispherical	–	–	34	1	35
bowl	miniature	1	–	15	1	17
bowl	outleaned wall	8	–	222	11	241
bowl	outleaned wall everted rim	–	–	1	–	1
bowl	outleaned wall flared rim	3	–	216	7	226
bowl	shallow outleaned	12	–	453	8	473
bowl	shallow with flared rim	–	–	1	–	1
bowl	small	–	–	–	1	1
comal	comal	–	–	3	194	197
cylinder	–	13	–	77	5	95
cylinder	tall cylindrical	1	–	22	–	23
jar	curved back neck	1	1	1	48	51
jar	flared rim	–	–	1	–	1
jar	globular	–	–	14	–	14
jar	large storage jar	–	–	9	6	15
jar	long neck with flared rim	1	–	–	–	1
jar	long-necked	–	–	1	–	1
jar	seed jar	–	–	55	10	65
jar	short neck	–	–	3	–	3
jar	small	–	–	310	5	315

General form	Specific form	Amarillo	Crema	Gris	Café	Total
jar	straight neck with everted rim	1	–	–	3	4
jar	upturned rim	–	–	1	–	1
jar	wide mouth	1	–	1	–	2
molcajete	–	–	–	6	–	6
plate	–	–	–	3	–	3
sahumador	shallow outleaned	–	–	1	59	60
total		48	1	1520	372	1941

* rim diameters for each form are listed in Appendix 3.

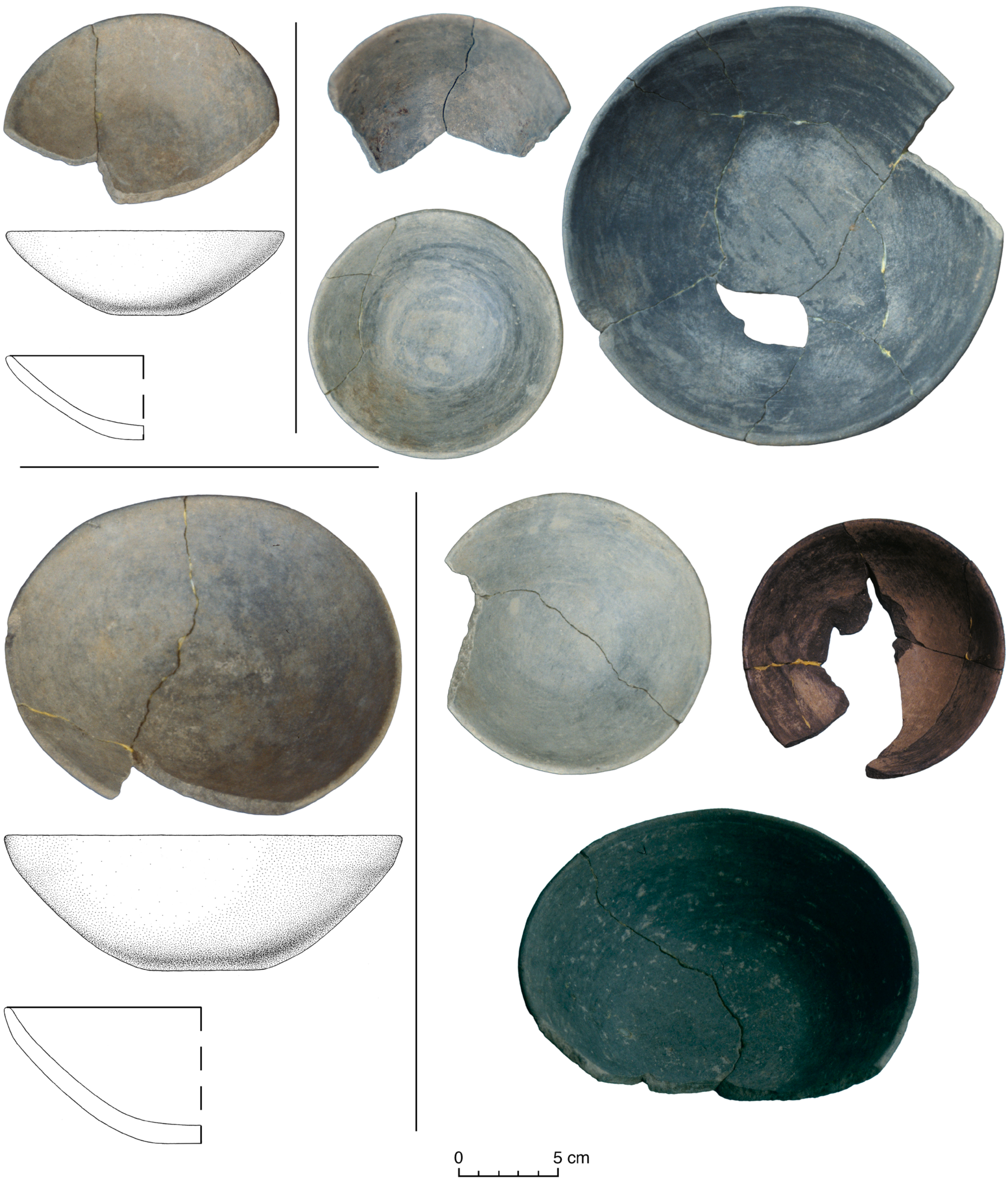

Figure 5.12. Gris shallow outleaned bowls with flat bases.

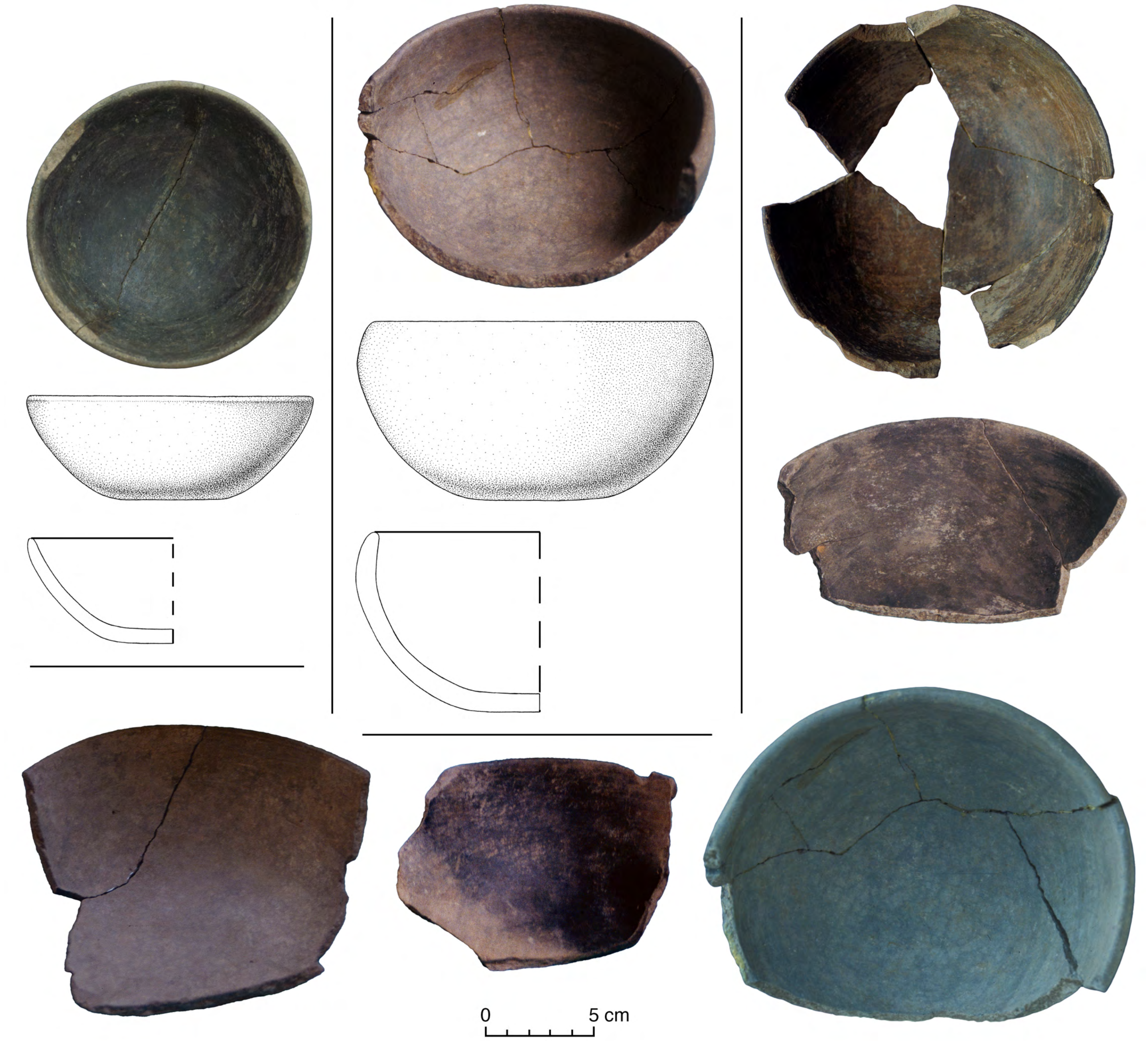

Figure 5.13. Gris hemispherical bowls.

including large café storage jars that often have handles (Figure 5.19). Many large cooking vessels have exterior charring from exposure to heat during meal preparation (Figure 5.20). Other gris jars are fine-paste vessels with thinner walls; larger ones were most likely used for storing water (Figure 5.21) and smaller ones for storing seeds and the like (Figure 5.22). Although there are some café seed jars (see Figure 5.19 left), those and other jars with small mouths are much more likely to have been made in gris paste (see Table 5.3). The assemblage also includes lids for covering large storage vessels (Figure 5.23) and several small café jars with simple appliques on the exterior shoulder (Figure 5.24; see Caso et al. 1967, figure 350a).

The other common vessel forms are comals (tortilla griddles, ~9%) and sahumadors (incense burners, ~7%), almost all (98%) of which were made of café paste. Café paste was the preferred clay for ceramic vessels that were subjected to heat in the normal course of their use lives. At Ejutla, only low quantities of these forms were made of gris paste (see Table 5.3). Grayware vessels (often made with fine, alluvial clay) are much more likely to be bowls. Alternatively, vessels made of café paste are more evenly divided between bowls, jars, comals, and sahumadors. Café paste generally includes more inclusions or temper. Most of the comals that we could measure are quite large, between 35 and 40 cm in diameter (Figure 5.25). Most of the sahumadors are shaped like small frying pans, with small perforations in the bowl (Figures 5.26) and thick hollow tubes for handles (Figure 5.27; Martínez López et al. 2000, 191–93). Most sahumadors are undecorated. An exception in the collection is one unusual large vessel with a medallion applique just below the exterior rim (Figure 5.28) that appears to be a sahumador or brazier. Although it was broken, a large hollow tube of the same paste was found adjacent to it during the excavations.

Figure 5.14. Gris cylindrical bowls and amarillo cylinders.

The various utilitarian vessel forms were dispersed throughout the excavated area, in the house and pit kilns and throughout the middens both above and below the domestic structure. Although the densest accumulations of most forms were in the middens, the distribution of several vessel forms provides some indications regarding probable room functions. For example, comal fragments were especially abundant in several excavation units in the northwestern corner of the residence (Feinman and Nicholas 1994, figure 30), where we had uncovered a shallow firepit (see Figure 3.14). The high density of comals helps confirm what we had suspected during the excavations, that this area of the structure was used as the 'kitchen' for food preparation; comals were especially abundant in the midden outside the kitchen. Gris *molcajetes* (a form used for grinding) also clustered in one of the units that includes parts of the kitchen and kitchen midden (see Figure 4.37; Feinman and Nicholas 1994, figure 21).

Another class of objects, generally made of ceramic, are spindle whorls. These spinning weights were unusually abundant in and around the excavated house at Ejutla

Figure 5.15. Café shallow outleaned bowls.

Figure 5.16. Small and miniature gris bowls.

(Figure 5.29). A key variable in spinning distinct types of fibers is the size, or weight, of the whorl (e.g., Parsons 1972; Parsons and Parsons 1990). Based on prior studies, the Ejutla spindle whorls (n = 109) could be divided into three basic categories based on weight (Carpenter et al. 2012). Most (>75%) of the whorls are small (<8 g) and best suited for spinning cotton thread or very fine maguey fibers (Parsons 1972, 61). Although a small subset was too fragmentary to determine size, the remaining 19 are medium-sized whorls (8–28.9 g), appropriate for spinning

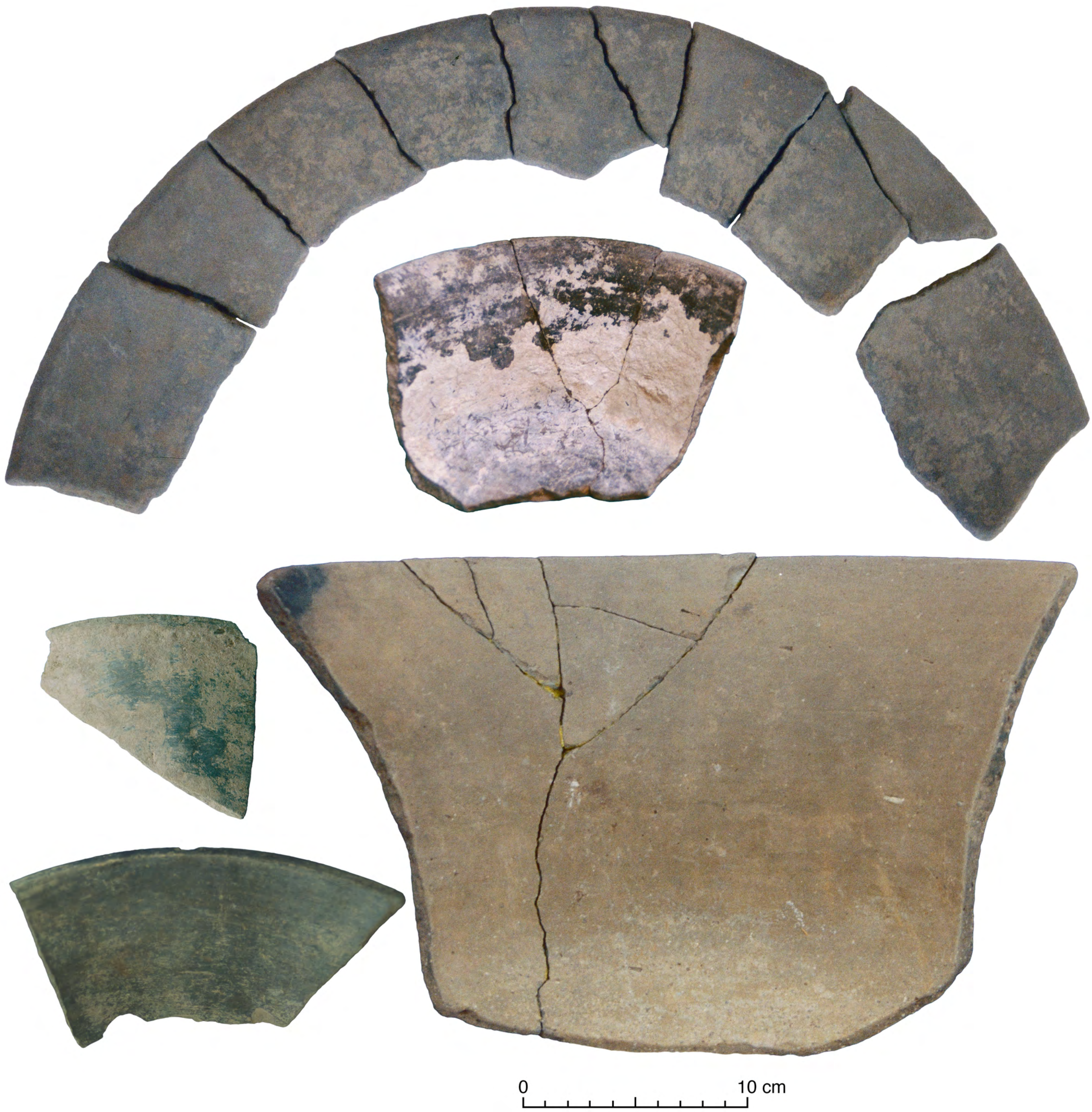

Figure 5.17. Large serving vessels.

fine and multipurpose maguey fibers. Larger whorls (>29 g) for spinning coarse maguey fibers (Parsons 1972, 61; Parsons and Parsons 1990) were absent at Ejutla. We present evidence for the local manufacture of ceramic spindle whorls in chapter 7.

The ceramic figurines and effigy vessels (urns) that were introduced in chapter 4 also are part of the domestic ceramic assemblage. These objects were used in various funerary and other household rituals instead of daily quotidian activities and, when broken, were discarded with other residential trash. There were thousands of mostly mold-made figurine fragments and hundreds of urn fragments in the kilns and middens. Because making figurines (and also urns) was one of the craft specializations of the Ejutla potters, we discuss the figurines and their manufacture in chapter 7.

The pottery assemblage collected in and around the house we excavated in Ejutla includes objects that they made, objects that they used, and objects that they likely made and used. It is not always easy to determine the production and use life of every artifact. Nevertheless, we generally can make these determinations for classes of objects. We also observed that the residents of this Ejutla residence had a full Classic period Valley of Oaxaca ceramic assemblage, some classes of which they fabricated themselves.

Figure 5.18. Large café basins, some with bolstered rims (top left).

Figure 5.19. Café jars including small seed jar (left) and large coarse-paste café storage jars with handles.

Figure 5.20. Charred gris and café jars.

Figure 5.21. Large, fine-paste gris and amarillo jar rims, including jars for storing water.

5.3.2. Stone Tools

Mixed with the ceramic trash were chipped and ground stone tools that are commonly found in prehispanic domestic contexts in the Valley of Oaxaca. Basalt, chert, quartz, and obsidian tools dominated the assemblage (Table 5.4). The most abundant tools were imported obsidian blades, most of which were broken and heavily

Figure 5.22. Small jars, many for storing seeds.

Figure 5.23. Lids for covering large storage jars or cylinders.

Figure 5.24. Café jars with appliques.

Figure 5.25. Café comals, several of which could be partially refitted.

used (Figure 5.30). A small number of blades had been worked into small perforators, projectile points, and other tools (Figure 5.31). Given their sharp cutting edge, the obsidian blades were a preferred tool for a variety of tasks, from domestic activities to shell working and lapidary (see chapters 8 and 9). Compared to the other Classic period houses we excavated in Oaxaca, obsidian blade fragments were abundant in the Ejutla residence, which would seem to reflect the use of the blades in marine shell craftwork.

Most other tools at Ejutla were made from local sources of stone, especially chert and basalt. Most of the chert tools were bifacially and unifacially worked flakes (Figure 5.32). There were lower quantities of projectile points, gouges, scrapers, and perforators, but among the perforators were more than 150 microdrills (Figure 5.33, Figure 5.34). Microdrills were rare in the other Classic period houses we studied, and their prevalence at Ejutla was also related to the craftwork in shell (see chapters 8 and 9). Tools of basalt were abundant, mostly large flakes with bifacially and unifacially worked edges (Figure 5.35), but also perforators, choppers, scrapers, polished stone axes, and tools that may have been used in farming activities (Figure 5.36, Figure 5.37). Basalt and other stones were roughed into hammerstones and other heavy tools (Figure 5.38). We recovered many smooth, rounded stones, mostly of quartz, which were likely utilized both in working the shell and burnishing ceramics. These were classed as burnishing stones and abraders, and while many were quartz, some were of other stone materials (Figure 5.39). These tools also could have been used for a variety of domestic tasks (Table 5.5). Most of these ground and chipped stone tool forms are present in the assemblages at the other Classic period sites we excavated, but in spite of general similarities, there are significant differences in the quantities, for example the microdrills at Ejutla that are all but absent at the others (Feinman and Nicholas 2004a, 2007a, 2007b, 2011b), and the stone material selected for specific tools. These differences reflect not only the availability of stone resources near the sites but also the crafting tasks for which the tools were made.

Other tools can be tied to more specific domestic tasks, such as manos and metates for grinding corn and other foods and materials, or raspadors, the dome-shaped scrapers that are used in processing xerophytic plants

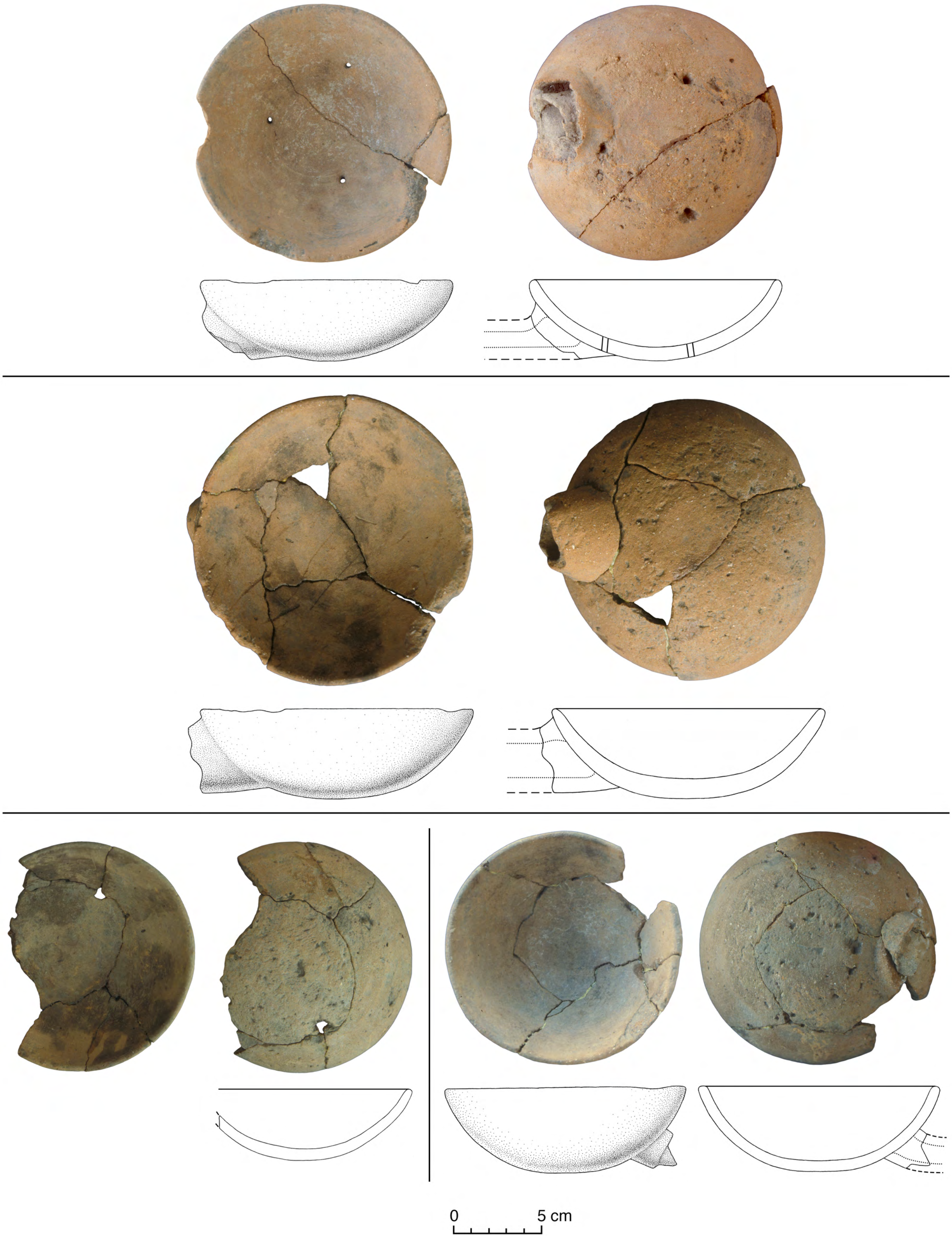

Figure 5.26. Café sahumadors shaped like small frying pans.

(Hester and Heizer 1972; Robles García 1994). These tools were present at Ejutla, but in different proportions than at the three sites in the Tlacolula arm of the valley. Metates were considerably more abundant at Ejutla, where we collected 45 metate fragments in addition to the one in the tomb wall (Figure 5.40), and 55 manos (Figure 5.41). Quantities of metates were lower at Lambityeco (3 from 1 house), El Palmillo (7 per house), and Mitla Fortress (12

Figure 5.27. Café sahumadors and thick hollow handles.

per house), as were manos, with 25 at Lambityeco, 28 per house at El Palmillo, and 40 per house at the fortress. In contrast, there were many fewer raspadors at Ejutla, only 10, compared to 34 at Lambityeco and 40–42 per house at the Mitla Fortress and El Palmillo (see Haines et al. 2004, figure 6). These differences in the stone tool assemblage reflect, at least in part, the different environmental settings of the sites; Ejutla was located on the valley floor near the Ejutla River and surrounded by good agricultural farmland where sufficient harvests of maize were possible (Feinman and Nicholas 1990). The other three sites were located in the drier, eastern arm of the valley where maize harvests were riskier and there was a greater abundance of xerophytic plants, including maguey that could be processed for food and fiber (Feinman and Nicholas 2005, 2020b; Feinman et al. 2007).

Figure 5.28. Large reconstructed café bowl with medallion applique on the rim, found with a large hollow tube that appears to be from the same vessel.

5.3.3. Subsistence and the Faunal Assemblage

Metates for grinding maize and comals for cooking tortillas are broadly found in prehispanic domestic contexts in the Valley of Oaxaca, even though the importance of maize varied across the region (e.g., Feinman and Nicholas 2024; Feinman et al. 2007). Based on the preponderance of metates and comals at Ejutla, maize was an important part of the diet, with members of the household processing and cooking their own corn. But the way corn is processed and cooked does not generally leave carbonized remains that preserve, and most of the carbonized remains at Ejutla are fragments of wood used in fires. We recovered only a few burnt maize cupules and one carbonized bean fragment (Feinman and Nicholas 2024).

Faunal remains generally preserve better than plant remains, and they were abundant at Ejutla, although not generally well preserved. Many fragments could not be identified beyond class, such as unidentified mammal, reptile, or bird. Those that could be identified to at least order (~20%) comprise a wide range of animal taxa, including several domesticated species, small and large game animals, various small amphibians and reptiles, and small unidentified birds (Table 5.6). The most common animal species at Ejutla are domestic dog (*Canis familiaris*), deer (*Odocoileus virginianus*), turtle (Testudines order), cottontails (*Sylvilagus* spp.), and jackrabbit (*Lepus* spp.). All are taxa that were exploited in the valley in earlier times (Drennan 1976, 137–38; Flannery and Marcus 2005, 47–51; Flannery and Wheeler 1986; Lapham et al. 2013) and also at the three Classic period sites we excavated in

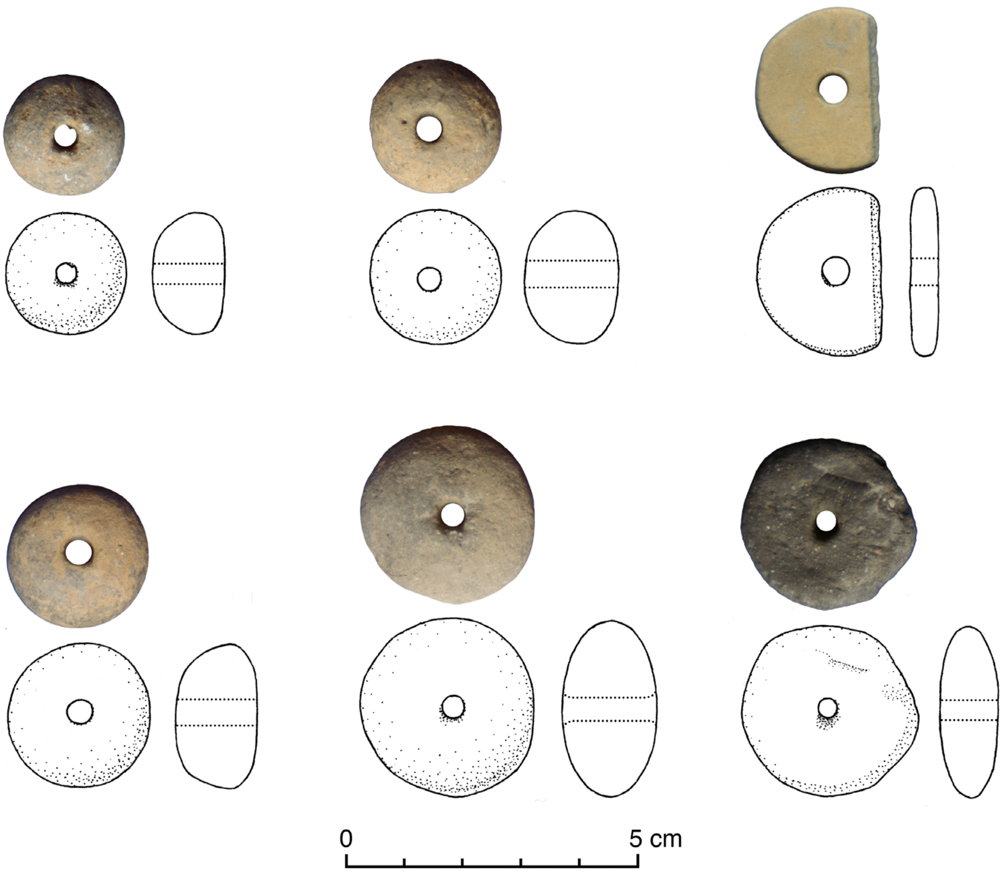

Figure 5.29. Sample of spindle whorls from Ejutla; all but upper right are modeled whorls.

Table 5.4. The stone assemblage at Ejutla.

Material	Lapidary	Natural crystal	Ornamental	Production debitage	Tool	Lapidary object	Total
andesite	–	–	–	1	13	1	15
basalt	1	–	–	5264	873	–	6138
chert	1	–	2	9677	1506	1	11187
crystals	40	103	–	–	6	4	153
feldspar	27	–	–	–	–	–	27
granite	–	–	–	22	114	–	136
greenstone	10	–	11	4	1	1	27
gypsum	5	–	–	–	3	–	8
igneous rock	–	–	–	4	8	–	12
ignimbrite/tuff	–	–	2	28	111	–	141
limestone	3	–	2	80	97	5	187
limonite	–	–	1	–	6	–	7
mica	190	–	1	–	–	–	191
mudstone	1	–	1	7	13	–	22
obsidian	–	–	14	175	2630	–	2819
onyx	56	–	–	–	–	11	67
other semiprecious	8	–	–	–	1	–	9
quartz	1	–	3	2109	621	1	2735
sandstone	–	–	1	3	19	1	24
schist	1	–	–	–	3	–	4
slate	–	–	–	–	–	1	1
UID stone	2	–	2	2	112	–	118
total	346	103	40	17376	6137	26	24028

Figure 5.30. Well-used obsidian blades.

Figure 5.31. Obsidian points and perforators.

Figure 5.32. Chert flakes and small retouched tools.

Figure 5.33. Chert projectile points and perforator (center left).

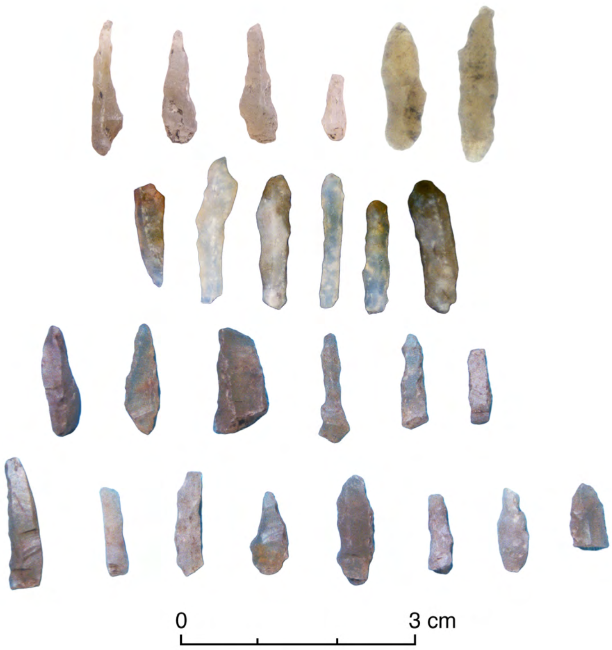

Figure 5.34. Chert microdrills.

the Tlacolula arm of the valley (Feinman and Nicholas 2024; Lapham et al. 2013; Middleton et al. 2002).

Although there are overall similarities in the faunal assemblages at Ejutla, El Palmillo, the Mitla Fortress, and Lambityeco, the suite of animals that comprise the majority of identified remains at each site is different (Table 5.7, Figure 5.42). Environmental setting is one factor. El Palmillo, on a ridge near mountains, and Ejutla, near the base of the tallest mountain in the surrounding area (Feinman and Nicholas 2013), have more deer remains than the other two sites. All four sites are located near streams or permanent springs where turtles are still found today, but Ejutla, which is located near prime mud turtle habitat in the floodplain of the Ejutla River (Lapham et al. 2013; Smith and Smith 1979), has by far the most turtle remains.

Other factors are not tied solely to environment. Domestic dogs were a principal animal species at all four sites, primarily raised as a high-quality food source that could have provided an important contribution to the diet (Middleton et al. 2002, 241). Rabbits were most abundant at El Palmillo (on a ridgetop) and Lambityeco (on the valley floor). The Mitla Fortress (on a hilltop) is the only site where turkey remains were abundant; they are almost entirely lacking at Ejutla (on the valley floor). Jackrabbits were present in low proportions at all four sites. These significant differences in the overall abundance (number of identified specimens) of different animals point to diverse subsistence strategies among the four sites (Feinman and Nicholas 2016b, 2024; Lapham et al. 2013). At Ejutla, dog, deer, and turtle were important, while at Lambityeco the focus was on dog and rabbit. Only at El Palmillo were dog, deer, and rabbit fairly evenly exploited. At the Mitla Fortress, dog and turkey were more heavily exploited than either deer or rabbit.

Only at the Mitla Fortress did we find direct evidence for turkey husbandry (Lapham et al. 2016), while dogs were raised at all four sites. But the preference for dog was more pronounced at Ejutla and Lambityeco, the two sites in alluvial settings where maize harvests were more reliable than in the hilltop sites in the drier, eastern end of the valley (Feinman and Nicholas 2024). The houses at Ejutla and Lambityeco correspondingly had higher proportions of comals in their domestic assemblages compared to the residences at the hilltop sites (Figure 5.43). The raw counts

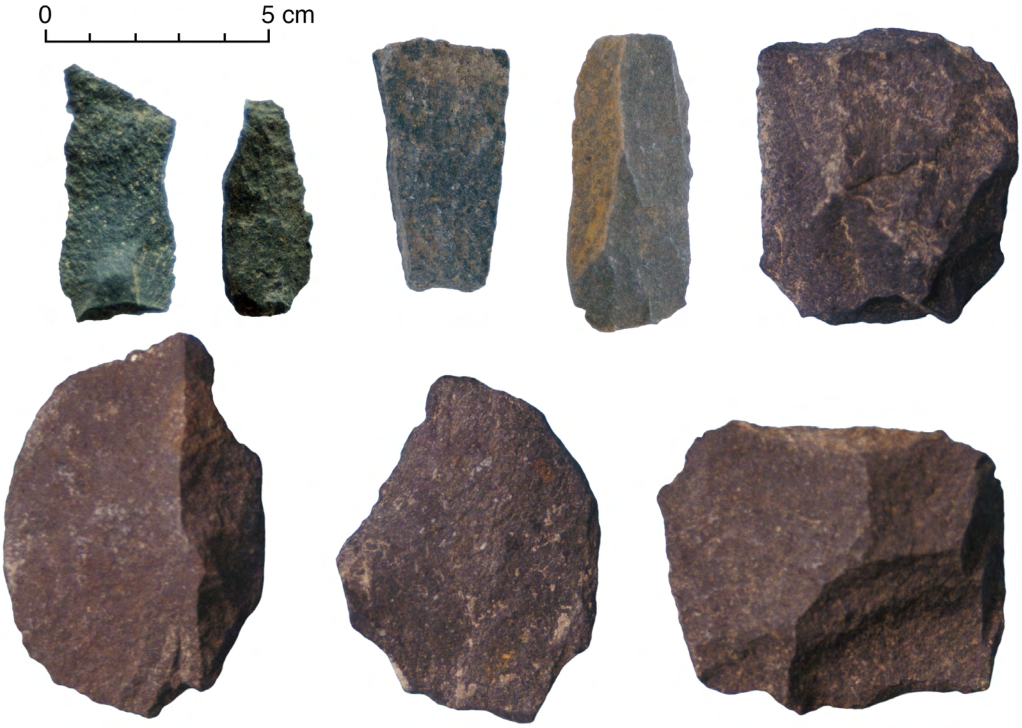

Figure 5.35. Large basalt flakes and flake tools.

Figure 5.36. Large basalt choppers and scrapers.

accentuate the differences, with three times as many comal fragments at Ejutla (~4800) than at the two hilltop sites (between ~950 and 1300 per house at El Palmillo and ~570 at the fortress). The greater quantities of maize at the two alluvial sites may be one factor in the higher proportion of dogs in their faunal assemblages. Maize was an agricultural staple across much of Mesoamerica, with surplus corn fed to dogs, often in significant quantities (Pérez Rodríguez et al. 2020; White et al. 2004), even into more modern times (Pérez Rodríguez 2016). In cleared alluvial areas, like Ejutla and Lambityeco, where there were fewer wild animals but more water and more crops, dogs could become an alternative meat source that were fed excess corn, either as food scraps or through purposeful feeding.

That the residents of Lambityeco and Ejutla appear to have relied on dogs to a greater degree than did those living at the other two sites should not be surprising given the prehispanic Mesoamerican symbolic linkage of dogs with the agricultural cycle and the cultivation of corn (Valadez and Blanco 2005).

5.4. The Neighborhood

Approximately 30 m south of the excavated house we noted a concentration of cut stone blocks on the surface in association with large quantities of cut shell debris and broken ornaments, many worn obsidian blades, and broken pottery and other residential trash (Figure 5.44). The building stones, based on their size and form, appeared to be the remains of another prehispanic structure that had been destroyed by recent plowing in an area with less soil buildup above the natural bedrock than in the area of the house that we excavated. We suspect that another contemporaneous house was situated in this area. This location (and residence) was also clearly associated with shell craftwork. Given the distribution of prehispanic artifacts and other domestic trash across the 5 ha area where we mapped surface shell debris, the two houses, roughly 30 m apart, almost certainly are not the only two prehispanic houses in this sector of the Ejutla site. Other concentrations of denser surface artifacts mixed with shell at Ejutla are likely the remains of additional houses (Feinman 2024).

Excavations of Formative period contexts in the Valley of Oaxaca decades ago documented specialized production in houses as early as the Early Formative period (Drennan 1976; Flannery and Marcus 2005; Whalen 1981), and continued investigations have confirmed that the household was the primary unit of specialized production in Mesoamerica (e.g., Charlton et al. 1993; Feinman 1999; Feinman and Nicholas 2000; Healan 1986; Hirth 2009a, 2009b; Kowalewski and Heredia 2020; McAnany 1993, 233; Roemer 1982; Shafer and Hester 1983, 529; Spence 1987, 434). Households are part of neighborhoods, an intermediate organization, or institution, between domestic units and the community or city (Arnauld et al. 2012). Because neighborhoods emerge through the bottom-up processes of the members' actions—by residential proximity, by sharing labor for agriculture or crafting, or in collective efforts to provide services to the component households that are not entirely provided by higher-level

Figure 5.37. Basalt axes and celts.

Figure 5.38. Hammerstones and other large ground stone tools.

institutions—they are variable in purpose, character, and density (Carballo et al. 2022; Kowalewski and Heredia 2020).

The neighborhood is the locus for many cooperative activities among households (Blanton 1994). During the intensive surface study of the eastern sector of the Ejutla site, we found that the densities of shell debris and the distribution of shell ornaments, species, and other craft byproducts were not uniform (Feinman et al. 1991). Small angular pieces of nacreous shell, possibly for mosaic inlay, were widespread, whereas shell beads were more prevalent in the northern part of the sector and shell bracelets (and bracelet debris) and pendants were more abundant in the southern part. We found small shell disks predominantly in the central and southern areas, where we also collected small stone cylinders that are of similar diameters, leading us to suspect that the same cane drills were used to work stone as well as shell. There was similar variability in the distribution of shell species. *Pinctada* and *Strombus* were widespread, *Patella* and *Ostrea* were more prevalent in the south, and *Spondylus* was most abundant in the center. We found all of these categories of objects in and around the excavated house, so different craft activities do not appear to have been completely segregated by house. But rather, there likely was cooperation and sharing of materials and technologies across this residential neighborhood where members of the component households engaged in working marine shell or other crafts. Different domestic networks and contacts as well as individual skills and abilities may have led the members of some households to focus on certain species and materials, while others concentrated on different ones. We see this kind of variability in consumption and production at El Palmillo,

Figure 5.39. Stone abraders, including small rounded quartz pebbles and one stone with visible abrasions.

where we excavated eight domestic units (Feinman and Nicholas 2010, 2012; Feinman et al. 2018c).

Using the findings from the intensive surface survey at the periphery of contemporary Ejutla, we endeavored to estimate how many other households might have been involved in shell craftworking at the eastern edge of the Ejutla site. We addressed this question from two different perspectives: surface survey findings and spacing between excavated houses. During the regional survey of the Ejutla Valley, we followed the procedures that were used during the surveys of the Valley of Oaxaca (Blanton et al. 1982; Kowalewski et al. 1989) to estimate the population of all sites. For valley floor sites like Ejutla where most ancient houses are not visible on the surface, we used 10–25 people per hectare of site area. Those figures produce a range of 50–125 people in the ~5 ha area with surface shell debris. Five hectares is a minimum size for the shell-working neighborhood, as the modern town encroaches onto the fields with shell, and the western edge of the area with

Table 5.5. Principal stone tools at Ejutla.

Stone	Abrader	Biface, uniface	Blade	Burnisher	Celt, adze, ax	Flake tool	Mano	Metate	Hammerstone	Microdrill	Perforator	Projectile point	Punch, gouge	Scraper	Spindle whorl	Wedge	Work platform	Total
andesite	–	1	–	3	–	–	–	5	1	–	–	–	1	–	–	–	–	11
basalt	11	252	1	22	23	192	18	16	33	–	118	3	4	111	–	4	4	812
chert	1	937	9	10	1	156	–	–	1	169	45	25	61	74	–	9	–	1498
crystals	–	–	–	2	–	–	–	–	–	1	3	–	–	–	–	–	–	6
granite	4	2	–	10	–	7	20	14	16	–	–	–	3	–	–	–	2	78
gypsum	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	3
igneous rock	–	–	–	–	–	1	1	–	–	–	–	–	2	1	–	–	–	5
ignimbrite (tuff)	5	–	–	4	–	–	3	6	1	–	–	–	1	–	–	2	2	24
limestone	3	3	–	42	1	10	3	3		–	–	–	1	2	–	2	1	71
limonite	2	–	–	1	–	–	–	–	–	–	–	–	–	1	–	–	–	4
mudstone	1	1		1	2	3	2	–	–	–	–	–	–	–	–	–	–	10
obsidian	–	–	2534	–	–	6	–	–	–	4	60	13	–	12	–	–	–	2629
quartz	2	80	1	431	1	42	–	–	6	2	28	1	8	6	–	2	2	612
sandstone	2	–	–	4	–	–	3	1	1	–	–	–	–	–	1	–	1	13
schist	–	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	1	3
UID stone	7	–	–	67	3	–	6	1	6	1	–	–	1	1	–	–	1	94
total	38	1276	2545	601	31	417	56	46	66	177	254	42	82	208	1	19	14	5873

Figure 5.40. Metate in the tomb wall and other metate fragments.

shell is approximate. Using the midpoint of the population ranges and an estimate of 5 people per house (e.g., Marcus 1976; Winter 1976b), there would have been ~17 houses in the shell-working neighborhood.

The Early and Middle Formative period houses unearthed by Flannery's Prehistory and Human Ecology of the Valley of Oaxaca research program (Flannery 1976b; Winter 1976a) provide data on the spacing between houses that we used to calculate the number of houses in the Ejutla neighborhood. Based on excavated findings, houses at the Formative villages tended to be 20–40 m apart (Drennan 1976; Marcus 1976; Whalen 1976, 1981; Winter 1976a). The midpoint (30 m) corresponds to the distance between the excavated house at Ejutla and the probable house 30 m to the south. (The Classic period hilltop terrace sites that we excavated are more compact, with residential terraces cheek by jowl in some parts of the sites.) The house lot of the excavated house at Ejutla (including middens and pit kilns) was approximately 800 m^2. If we assume other house lots were of similar size and separate all house lots by ~30 m, then there may have been 16–17 houses in the 5 ha neighborhood (Figure 5.45; Feinman 2024) and 80–85 people. These figures fit well within the estimates

Figure 5.41. Large manos.

Table 5.6. The Ejutla faunal assemblage.

Scientific name	Common name	Quantity
bird UID	–	89
Canis familiaris	domestic dog	525
Canis familiaris?	domestic dog	8
Canis latrans	coyote	1
Crotalus atrox	Western Diamondback rattlesnake	1
Didelphis marsupialis	opossum	13
fish UID	–	7
Lepus sp.	jackrabbit	92
Mammalia (class)	–	4301
Meleagris gallopavo	turkey	9
Odocoileus virginianus	white-tailed deer	290
Odocoileus virginianus?	white-tailed deer	3
Orthogeomys spp.	gopher	1
Reptilia (class)	–	44
Rodentia (order)	mouse, rodent	35
Rodentia small	–	13
Sciuridae (family)	squirrel	43
Serpentes suborder	snake	27
Squamata (order)	lizard	7
Sylvilagus spp.	cottontail rabbit	194
Testudines order	turtle	239
Urocyon sp.	fox	1
UID	–	2853
total		8796

Table 5.7. Percentage of the most important meat-bearing animals* in the faunal assemblages at four Classic period sites in the Valley of Oaxaca.

Lambityeco	Ejutla	El Palmillo	Mitla Fortress
dog (52.9%)	dog (39.0%)	dog (35%)	dog (37%)
rabbit (21.9%)	deer (21.6%)	rabbit (27.8%)	turkey (25.6%)
deer (7.2%)	turtle (17.5%)	deer (20.1%)	deer (13.1%)
jackrabbit (6.6%)	rabbit (14.5%)	jackrabbit (9.9%)	rabbit (9.9%)
turkey (5.8%)	jackrabbit (6.8%)	turkey (4.6%)	turtle (7.5%)
turtle (5.5%)	turkey (<1.0%)	turtle (2.7%)	jackrabbit (6.9%)

*Based on number of identified specimens of each taxa.

Percentages are relative abundances among these six taxa.

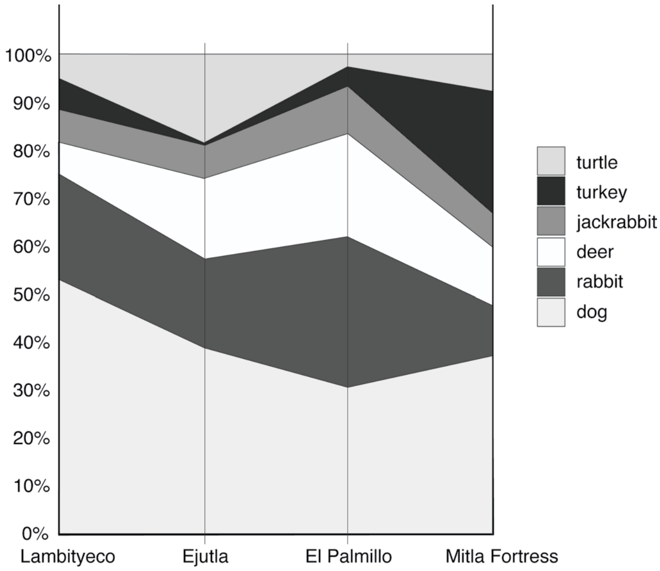

Figure 5.42. Relevant abundance of the principal meat-bearing animals at Ejutla, Lambityeco, El Palmillo, and the Mitla Fortress.

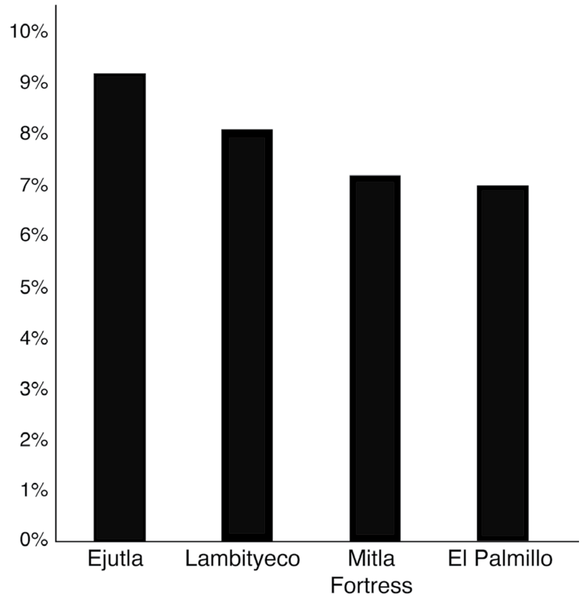

Figure 5.43. Percentage of comals in the ceramic assemblages at Ejutla, Lambityeco, El Palmillo, and the Mitla Fortress.

Figure 5.44. Prehispanic domestic refuse and building stone fragments on the surface 30 m south of the excavated house at Ejutla.

Figure 5.45. Map showing the projected distribution of prehispanic houses in the area with surface shell debris on the east side of Ejutla.

derived from the regional survey based on 10–25 people per hectare for valley floor sites.

5.5. The Ejutla House and the Broader Region

The excavated house is located in a barrio of craftworkers at the edge of the Ejutla site, approximately 350 m east of the main civic-ceremonial core of the site, where several large mounds are still visible above surrounding modern house lots. All of the mounds are heavily damaged, and none have been excavated. The only other excavations at the site are those by Diguet (1905), who investigated a later Postclassic cruciform tomb in the early twentieth century. There are no visible remains of this tomb today. So, the house we excavated provides the most detailed set of information on Ejutla and its relations with the Valley of Oaxaca.

Even though the Ejutla site is located in a small alluvial valley at the southern end of the much larger valley to the north, the house we excavated has many characteristics that are typical of prehispanic houses in the Valley of Oaxaca. The residential complex consisted of a series of small rooms that enclosed a central patio. There was a subfloor tomb under one of the rooms that was entered through the patio. The walls of the rooms sat on foundations of cut and roughly formed stones. Plaster remnants indicate that at least some of the floors had been plastered at one time. The size of the Ejutla house fits well within the size range of middle-status Classic period houses in the Valley of Oaxaca. The shell craftworkers were neither low nor high status.

Except for the unusual quantities of Pacific marine shell at Ejutla, the domestic artifact assemblage has typical forms and elements found across the Valley of Oaxaca, including an abundance of grayware pottery. The funerary urn that was one of the mortuary offerings in the tomb and other urn fragments in the middens (see Figure 4.52, Figure 4.53, Figure 4.54, Figure 5.9) have a range of characteristics that identify them as Zapotec (Caso and Bernal 1952; Caso et al. 1967), similar to effigy vessels found across the valley. The paired vases in the dedicatory offering were carved with distinctive imagery that represents the mythological figures '1 Tiger' and '2 J' (also referred to as '2 Maize') (see Figure 4.56, Appendix 2; Bernal 1947–48, 62; Caso and Bernal 1952, 62–64, 78–81; Caso et al. 1967, 326; Urcid 2005, figure 2.2). Similar sets of paired vessels have been found at Monte Albán (Caso et al. 1967, 328) and elsewhere in the Valley of Oaxaca (Marcus and Flannery 1996, 224; Urcid 2005, 21). The effigy vessel and vases help tie the house to a larger network of interactions that connects it to communities in the Valley of Oaxaca and the broader region.

The residents of the excavated Classic period Ejutla house clearly shared an array of stylistic practices and conventions with their contemporaries to the north in the Valley of Oaxaca. Therefore, as we detail in chapters 6 through 9, it is not that surprising that the occupants of this house were participants in economic networks that ranged from the Pacific Coast to the Valley of Oaxaca and even well beyond (chapters 8 and 9). At the same time, as we see with the intensity of shell craftwork (chapter 8), food consumption patterns, and even the stylistic (clothing) differences of molded fired-clay, male, warrior figurines (chapter 7), the Classic period past of the Central Valleys of Oaxaca was not homogeneous. Activities and practices in Ejutla had key distinctions as compared to more centrally situated sites in the Valley of Oaxaca.

6

Domestic Specialization and Multicrafting in Theoretical Context

To this point, we have established that a Classic period domestic unit at the eastern edge of the Ejutla site engaged in crafting goods that almost certainly were not produced primarily for their own consumption. In this chapter and those that follow, we outline and contextualize this finding and why it is important for understanding the Classic period economy of Oaxaca, and present further details regarding the production technologies and practices for a range of materials. We also outline what we know about the distribution of the products that were made by this household, and what and how these production and distribution practices tell us about premodern economies.

The archaeological investigations at and findings from the Ejutla site have had a significant influence on our own thinking regarding craft specialization and prehispanic Mesoamerican economies more generally. In this chapter, we step back from the description and analysis of empirical discoveries and place those findings and current thoughts on production in a broader historical and conceptual context. By so doing, we illustrate how archaeological data, first from the Ejutla site, and then when examined in a wider context of new research elsewhere, stimulated our theoretical rethinking. In the process, we moved away from generalized, unilinear models and categorical treatments of specialization, which were derived principally from selective attention to the Eurasian past, toward a major reframing of prehispanic Mesoamerican economies (Feinman and Nicholas 2012) and premodern economies more generally (Feinman 2017).

We begin by defining craft specialization and placing the archaeological examination of this practice in historical context. This intellectual background is relevant as the senior author's research in the Valley of Oaxaca began with an interest in economic specialization (Feinman 1980), and those perspectives shifted to a degree in concert with the new findings derived from the Ejutla research. Thus, the emphasis here is to tie changing disciplinary views of craft specialization to seeming conundrums posed by observations from the Ejutla research. Their iterative juxtaposition had a role in formulating how we think about prehispanic Mesoamerican economies and specifically production and distribution at Ejutla.

6.1. Craft Specialization and Its Early Archaeological Framing

The term 'craft specialization' has been critically examined (Clark 1995; Rice 2009), yet we think it is a useful term to describe nonagricultural production intended for exchange. By craft, we infer manufacture by humans as opposed to grown in the field or garden. Use of the term does not imply a specific level of skill or technical expertise. In using the term 'specialization,' we reference John Clark and William Parry (1990, 297), who broadly define it as the "production of alienable durable goods for nondependent consumption." That is, the products are destined for consumers beyond the maker's or the producer's immediate domestic unit. We employ this broad definition so as to intentionally decouple any presumptions that have been previously assumed regarding the intensity or location of production, the targeting to a specific subset of consumers, or a particular mode of distribution. We see craft specialization as an activity more than a category or taxonomic attribute always linked to a specific social scale (Cross 1993). The realm of behaviors associated with craft specializations should be fleshed out and defined as much as possible for each historical context.

Given the global breadth and analytical depth of current archaeological research focused on craft production (e.g., Costin 2020; Schortman and Urban 2004), related to many different materials and goods, it may surprise that the implementation of archaeological investigations with a focus on economic specialization began only six to seven decades ago. With that timing, the history of craft production studies in archaeology is tightly intertwined with the advent of neoevolutionary theories and neo-Marxist thought in the discipline (Wailes 1996), often linked with sociopolitical change. Early efforts to tease production information from the archaeological record began with the seminal writings of V. Gordon Childe (e.g., 1949, 1950), who viewed craft specialization as a categorical attribute of the Urban Revolution, an outgrowth of agrarian surplus and tied to elite economic control. Childe (1949) pointed the way toward drawing 'social facts' from 'material things,' and the studies that followed both built on and shadow-boxed with his seminal writings (Wright 1996). Although Childe's perspective was tied empirically to ancient Mesopotamia and metallurgy (Wailes 1996), implications from his (and related) conceptual framings were extended much more widely.

Mid-twentieth-century neoevolutionary framing saw economic specialization as a nominal or categorical variable, either present or not, and, if present, presumed to be full-time. In this unilinear view of change (Costin 2020; Fargher 2009), craft specialization was seen to emerge with urbanism, whereas pre-urban households and settlements generally were presumed self-sufficient (Sahlins 1972). In contexts with urban centers, craft specialization was largely assumed to have been situated in cities themselves, while agrarian production was placed in more rural settings.

Based on these underlying tenets, early archaeological theorizing on economic production advanced a unilinear or monolithic sequence from domestic production for immediate use to workshop and ultimately factory manufacture (van der Leeuw 1976, 1977; Peacock 1982; Santley et al. 1989). These evolutionary schemes, analogically and selectively drawn from snapshots of historical and ethnographic data, were modeled broadly on similar stepped sequences of political organizational change (e.g., Fried 1967; Service 1962). In both cases, stages in the sequence were viewed categorically, so the intensity of production (quantities produced) was coupled with the scale of production (where goods were made), and to a somewhat lesser degree with presumed patterns of consumption (from immediate use by the maker's household to progressively more far-reaching modes of transfer and exchange). To a large degree and for decades (see Feinman 1999; Feinman and Nicholas 2000), production activities localized to domestic contexts were uncritically interpreted as nonspecialized production, hence, not for exchange. This false binary, which linked household production to self-sufficiency and presumed that specialized production was indicative of nondomestic contexts, was not directly challenged until Cathy Costin (1991) decoupled scale, intensity, and other dimensions of economic specialization. Of course, this dissection of the unilinear or monolithic frame was grounded in an expanded empirical record and set of archaeological indicators for craft production, to which we now turn.

6.2. Developing Archaeological Indicators and Frames for Specialized Production

From the earliest efforts to identify economic specialization in the archaeological record, investigators generally built on and offered expansions of (and gentle challenges to) Childe's (1950) conceptual framework. A key, early explicit effort (Evans 1978) to define archaeological indicators of economic specialization was focused on the Balkan Chalcolithic (Copper Age, ca. 5000–3500 BCE). Evans's overview, which looked at a range of different crafts including pottery, flint, and copper metallurgy from a suite of excavated sites, was instrumental in that it outlined a series of criteria for defining contexts of craft production. These indicators included tool kits associated with craft activities, unusual concentrations of raw or partially worked materials, defined areas of activity associated with production, and features linked to the manufacture process, such as ceramic firing features. In degrees of discord with more monolithic framing, the Chalcolithic contexts for these activities were decidedly not urban, and Evans (1978) also favored a view that these Balkan producers devoted less than full time to the production of the identified craft activities.

For the study of prehispanic Mesoamerica, the 1960s and 1970s were a key hinge point during which questions investigating urbanism, states, and hypothesized associated transitions (Rice 1981) subsumed the earlier disciplinary focus on chronology building. The identification and interpretation of production activities, especially for pottery and stone tools, became a key dimension of these studies, which mainly were focused on single sites examined through excavations (e.g., Shafer and Hester 1983) and intensive site-focused surface surveys (e.g., Spence 1981). Using findings from systematic regional surveys, the senior author and colleagues identified production locations for pottery, stone, shell, and other materials to begin to define shifts in the economic landscape over time (Blanton 1978; Feinman 1980). Unusual concentrations and densities of certain artifacts and materials provided the principal evidential indicators for all of these identifications, although for pottery, broad lines of indicative evidence were outlined (e.g., Stark 1985).

By the 1980s, the expansion of studies focused on craft production from around the globe broadened the contexts and conditions in which specialized craftwork occurred and diversified. Although 'attached specialists,' linked to political principals and their households, were one common context for producers, other production activities were more untethered from or 'independent' of the political process. Models proposed that specialized production was in different contexts spurred by commercialism, economic or demographic growth, and other socioeconomic factors (Brumfiel and Earle 1987). It became clear that specialized production was not merely an outgrowth of urbanism or the rise of states but could proceed those transitions as well as vary along various decoupled axes of variability.

Recognition that the premodern contexts of craft specialization were not strictly tied to elite sponsorship or top-down control provided a wide intellectual runway for Costin (1991) to outline multiple dimensions of variation in this economic activity, and to disentangle economic specialization from the necessity of political management, a linear process of change, or a nominal, categorical definition. Drawing on expanded literature, Costin (1991, 9) defined four key axes or dimensions of variability: context (degree of elite sponsorship), concentration (distribution of production activities), scale (setting—house to factory), and intensity (volume of production), which did not necessarily shift in concert.

For Mesoamerican archaeology, Costin's (1991) publication, and especially her decoupling of the scale and intensity of production, was timely as it arrived when debates were arising regarding two important examples of craft production in prehispanic Mesoamerica: obsidian working at Teotihuacan (Central Mexico) and chert tool production at Colha (Belize). In both cases, the presumed neoevolutionary link between levels of production for exchange (intensity) and the locus of production (scale) created interpretive dissonance. At Teotihuacan, the massive amounts of surface obsidian as well as the kinds of debitage recovered seemed to provide clear indications of specialization (Spence 1981). Yet, while some researchers presumed that the ample evidence for production debris was a clear indicator that obsidian working was enacted in nondomestic settings or workshops (Santley et al. 1989; Santley and Kneebone 1993), other investigators questioned the heavy reliance on surface findings, minimizing the presumed specialized production at Teotihuacan based in part on the surface mixing of domestic trash with the obsidian refuse (Clark 1986). John Clark (1986, 32) argued that production waste (which he expected to come from nondomestic workshops) should not be comingled with household trash, and that locations thought to have been areas of specialized production at Teotihuacan may just be garbage dumps or refuse accumulations. The anomalous 'mountains' of obsidian surface debris at the site were seen rather as 'molehills' when it came to high-intensity production for exchange (Clark 1986).

To a degree, this analytical debate stemmed from imprecision in the manner in which the term 'workshop' was employed (Costin 2020, 180), either as any location of production, or more precisely as a nondomestic setting where high-intensity production was carried out. But the even more fundamental disagreement stemmed from the presumption that scale and intensity of production were necessarily coupled in line with the monolithic model. Excavations at Teotihuacan subsequently have established that high-intensity obsidian working for exchange was enacted in a domestic context (Hirth et al. 2019).

At roughly the same time that the debate over craft specialization at Teotihuacan was happening, there were parallel discussions regarding the Classic Maya site of Colha, where excavations had yielded a suite of indicators for specialized chert tool manufacture for exchange (Hester and Shafer 1994; Shafer and Hester 1983, 1986, 1991). At that site, excavations exposed numerous dense concentrations of chert debris and large quantities of certain chert tool forms (both finished and unfinished). These tool forms made with similar chert materials were found at neighboring sites, but only in finished form. Much of the Colha chert debris was found adjacent to residences, seemingly indicating that these production activities were taking place in residential settings (McAnany 1993, 233).

Nevertheless, as at Teotihuacan, the seemingly strong case for craft production at Colha was challenged (Mallory 1986), and it was argued that the chert concentrations were just waste dumps while the tools were exclusively produced for local consumption. Undergirded by entrenched notions of self-sufficiency, the alternative view presumed that the occupants of a site, like Colha, that was not a major regional center must have principally been devoted to farming. Once again, core tenets of the monolithic, categorical model clouded the issue. Researchers on both sides of these interpretive debates were slow to recognize that high-intensity specialized production for exchange could be situated in domestic contexts, even when those activities were unlikely to have been full-time.

6.3. The Ejutla Research

The unusual surface concentration of marine shell that we first encountered in 1984 on the eastern edge of the modern town of Ejutla was noted during the regional survey project focused on the Ejutla Valley (Feinman and Nicholas 1990, 2013). From the survey and mapping of Monte Albán (Blanton 1978), the Valley of Oaxaca Settlement Pattern Project crews were vigilant and systematic in recording surface artifacts, including atypical concentrations, that could be indicative of production activities. Despite this focus, archaeological contexts with even one piece of marine shell on the surface were relatively rare in the landlocked Valley of Oaxaca, and only a handful of sites (out of more than a thousand recorded during the systematic surveys) had more than a few pieces of shell (Blanton 1978; Blanton et al. 1982; Kowalewski et al. 1989). Pieces of shell debris and worked or cut shell fragments were highly infrequent on Oaxaca survey sites.

In this context, the surface shell findings, which included worked, cut pieces, at the eastern edge of modern Ejutla not only provoked a series of questions but opened a realm of analytical opportunities (Feinman and Nicholas 1990, 1992, 2013; see chapter 2). If the shell was indeed prehispanic, could be dated in accord with the surface pottery that was found with it, and could be placed into an identifiable context, then this location seemingly would represent a place where marine shell was crafted into ornaments. And, importantly, it also could provide an opportunity to investigate in what scalar context (house, nondomestic workshop) the shell was crafted. We already (chapter 1) have posed a series of related queries that we aimed to research, but we stress this question here as it was directly pertinent to the debates that were ongoing in relation to production at Teotihuacan and Colha. For this research question, shell was a fortuitous material to assess these issues, as it clearly was not a utilitarian good, as pottery or stone can be. Therefore, unlike those more basic goods, it seems less likely that the products of shell craftworking were entirely consumed by the producer's household.

During our first two field seasons of excavations at Ejutla (1990–91), we were able to rapidly discern that marine shell was indeed crafted at the site, the working of shell was definitely prehispanic, most of the shell came from the Pacific Coast, and other craft activities were enacted (pottery production) in the same setting (Feinman and Nicholas 1993; chapters 7, 8, and 9). We also strongly suspected that the setting that we were studying was a domestic context, an interpretation that we affirmed during excavation and analysis seasons in 1992–94 (chapters 4 and 5). Although much of the marine shell debris that we exposed was found in midden contexts, both chemical and microartifactual analyses linked craft activities, most specifically the working of shell, to domestic living surfaces (Feinman 1999; Feinman et al. 1993; Middleton 1998, 2004; Middleton and Price 1996). Stone tools (chert drills and obsidian blades) likely used to work shell were recovered in conjunction with the shell debris both in the middens surrounding the house and inside the residence.

At the same time, given the anomalous quantities of shell recovered in the contiguous area where we excavated part of a Classic period residence and adjacent external areas, it is clear that most of the shell ornaments prepared by the Ejutla craftworkers were not consumed by the householders themselves. Finished ornaments were a small fraction of the shell artifacts unearthed, and even the domestic tomb, associated with the excavated residence, contained only a single shell bead. The residents of this house cut and worked a suite of marine shell species, but finished ornaments made from most of those species were not found, which again seems to indicate that they were mostly distributed and consumed elsewhere.

The Ejutla craftworkers were specialists, producing in a residential context, but collectively they were not devoted full-time to making shell ornaments, as other crafts, including pottery, fired-clay figurine manufacture, and the working of stone were also evidenced in association with the excavated residence. Figurines made in Ejutla were consumed at other sites in that region (Carpenter and Feinman 1999; Feinman 1999). Farming and food preparation were also evidenced materially in the house that we studied (chapter 5). The practice of multiple craft production activities in association with a single domestic unit at the Ejutla site (Feinman 1999; Feinman and Nicholas 2007a) has recently been more widely recognized in prehispanic Mesoamerica as well as in other premodern economies (Brumfiel and Nichols 2009; De Lucia 2013; Hirth 2009a, 2009b, 2009c; Shimada 2007; Widmer 2009).

6.4. Broader Implications for Prehispanic Mesoamerican Economies

For the study of Mesoamerica, the dismantling of the monolithic, unilinear model of craft production and the decoupling of scale and intensity in regard to economic specialization, which was to a degree fostered by our findings in Ejutla (Feinman 1999; Feinman and Nicholas 2000), had revolutionary ramifications for how we think about ancient Mesoamerican economies and even premodern economies more generally. The recognition that almost all specialized craft production in prehispanic Mesoamerica, even late prehispanic metal working (Maldonado and Engelhorn-Zentrum 2009), was situated in domestic contexts holds even after several subsequent decades of intense fieldwork focused on many regions and eras of that macroregion's past. Furthermore, Mesoamerica is not the only premodern region where craft specialization of both utilitarian and prestige goods generally was situated in domestic contexts (e.g., Bernier 2010; Costin 2020).

The placement of most prehispanic Mesoamerican craft specialization in domestic contexts immediately casts doubt on the application of theoretical models (Marx 1971; Rosenswig and Cunningham 2017; cf. Feinman and Nicholas 2017) that uncritically extrapolated from other global regions and placed the control of most production in the hands of governors or principals (Feinman 1999; Feinman and Nicholas 2000, 2012). If hundreds or thousands of households across regions of prehispanic Mesoamerica produced goods for exchange, how could that production be centrally administered? Why do we lack any evidence of central storehouses for craft products? Given the realities of prehispanic Mesoamerican transport, the notion that weighty products, like ceramic jars or stone tools, were first confiscated by principals and then redistributed neither seems plausible, nor does it find a thread of empirical validation (Feinman et al. 1984; Feinman and Nicholas 2007b, 2012).

And yet, the realization that economic specialization in Mesoamerica was mostly centered in houses served to raise fundamental questions about the distribution and consumption of craft products. Markets, which impressed the Spanish invaders at the end of the late prehispanic Mesoamerican world (Feinman and Nicholas 2021), were generally diminished by anti-market frames (Cook 1968) that lessened their perceived importance and the temporal depth of their pre-Aztec presence in Mesoamerica. A plethora of recent studies have compiled multiple lines of evidence to document the importance and the diversity of precolonial Mesoamerican markets (e.g., Feinman and Garraty 2010; Feinman and Nicholas 2010; Garraty and Stark 2010; Masson and Freidel 2012; Shaw 2012). But Mesoamerican market systems were not just critical modes of exchange isolated to specific regions; rather, there is mounting indication that macroregional interconnections between local market networks extended across Mesoamerican regions long before the Aztec empire. Craft products and other goods were moved considerable distances across the macroregion over time (Blanton and Fargher 2012; Feinman and Nicholas 2020c; Feinman et al. 2022; Golitko and Feinman 2015; Hirth 2013). And the directionalities and volumes of Mesoamerican economic networks were variable over time and space (Blanton et al. 2005; Feinman et al. 2022); intensities and patterns of production and consumption were dynamic. Markets take different forms and roles in relation to governance in the political-economic contexts in which they are embedded (Feinman and Garraty 2010).

In general, when domestic consumption practices have been compared across settlements or regions, they tend not to be indicative of pooling or redistribution, but rather reflect other mechanisms of economic transfer, like marketplace exchange (Feinman and Nicholas 2010, 2012; Hirth 1998). More specifically, whereas a ceramic figurine made in Ejutla was exchanged to another settlement in the region (Carpenter and Feinman 1999; Feinman 1999; chapter 7), shell ornaments were likely moved longer distances, possibly even to Monte Albán (chapter 8), and mica from Ejutla traveled as far as Teotihuacan (Manzanilla et al. 2017; chapter 8). The findings from Ejutla underpinned a key step in eclipsing the false market/no-market dichotomy (Wilk 1998, 469) for prehispanic Mesoamerican economies and premodern economies more generally (Feinman 2017).

6.5. The Fiscal Financing of Governance

The set of queries and debates prompted by the realization that most prehispanic Mesoamerican craft specialization was domestically situated also extended to the issue of how prehispanic governance was financed or funded. After all, if governors were not in control of basic production and distribution, as now seems to be the case, then what can we say about the fiscal undergirding of Mesoamerican polities? This is not an easy question to address archaeologically, but fortunately a comprehensive study, based largely on early conquest-era texts, has provided a perspective on the fiscal financing of the Aztec empire (Smith 2015).

Although, in the past, Mesoamerican archaeologists have, perhaps, been too liberal in their extrapolations of Aztec practices to earlier eras, the wide array of financial resources procured by Aztec governors and tax collectors do provide some research directions that are worth considering. Most Aztec revenue for fiscal financing was derived from tax assessments, including of labor, land, and for market participation (Smith 2015). Taxes for the Aztec often were paid in crafted goods, especially textiles. The Aztec fiscal regime was heavily reliant on the taxing of the local population, or what has been referred to as internal revenues (Blanton and Fargher 2008). A reliance on internal revenues aligns with the relatively collective mode of governance or distributed power arrangement of the Late Aztec polity (Smith 2015, 106; see also Blanton and Fargher 2008; Feinman and Carballo 2018). Like textiles, marine shell ornaments (especially less elaborate or heavily crafted shell ornaments) were a kind of bulk luxury good (Blanton and Fargher 2012; Blanton et al. 2005), valued, but not extremely rare, and also not a basic necessity, like food.

The occupants of the excavated house in Ejutla made bulk luxuries (simple shell ornaments), goods produced for communal and domestic rituals (ceramic figurines and whistles), and basic utilitarian objects, such as fired-clay tortilla griddles and incense burners. In contrast, elsewhere in Mesoamerica, craft specialists attached to (or members of) elaborate or palatial households produced rare, highly valued goods for elite adornment or exchange (Emery and Aoyama 2007; Inomata and Triadan 2014). For the Classic Maya, at least, such prestige goods may have had a more direct role in financing the power of rulers through gift exchanges and other means that fostered the transactional networks and personalized performances of the powerful/palace dwellers (e.g., Halperin and Foias 2010; McAnany 2008). The centralized control of the trade corridors in which these high-value goods and products passed also was fundamental to the fiscal support of polities with more personalized, autocratic rule (Feinman 2021; Feinman and Carballo 2018).

6.6. Following Archaeological Threads

In this chapter, we have contextualized the research foundation and questions that we brought to the Ejutla study in a wider theoretical context, and we discussed how our findings contributed to ongoing debates concerning craft specialization, markets, and premodern economies. Over the last 50–75 years, the cultural evolutionary frameworks advanced by Childe (1950), Fried (1967), Service (1962), and others have spurred a bountiful episode of archaeological research across the globe, including in Mesoamerica. While we must recognize the great contributions of these researchers and how their ideas and concepts fueled research, it is also time to delve into, trust, and synthesize the expanded record on the past that 50–75 years of question-oriented investigations have generated.

Although archaeologists will always need models and examples from contemporary and historically described behaviors to help make sense of our highly partial material record, it is also time to acknowledge that the past is not a simple reflection of the present—and, furthermore, that conjectural constructs drawn from selective readings of snippets of historical or contemporary behaviors may not be adequate models for what happened in a past that was less homogeneous than often presumed. Rather than projecting rigid categorical constructs back onto the past, we now have enough information collected systematically, thoroughly, and along many empirical dimensions to build our interpretations of the past following threads of archaeological data forward, rather than extrapolating back from the present, thereby ignoring what we actually have painstakingly learned about the past by studying its empirical and material remnants.

7

Ceramic Production

In the preceding chapters, we started to outline multiple lines of evidence for ceramic production in a residential context at Ejutla. The amount of broken pottery we encountered during the excavations was overwhelming. Even without counting the many sherds that were no larger than a thumbnail, we collected 210,000 vessel fragments and other ceramic objects weighing approximately 3500 kg. This was the ceramic assemblage associated with one prehispanic house and associated exterior area, the composition of which was fairly standard utilitarian vessels that are typical of Classic period domestic contexts, including jars, bowls, comals, and other forms that we described in chapter 5. Yet we also recovered especially high quantities of some vessel forms. These include sahumadors and comals as well as quantities of figurines and ceramic spindle whorls that seemed anomalously large for one household. We also recovered molds for making various ceramic forms, especially figurines, and hundreds of pottery wasters and defective, misfired fragments that could not have served their intended use. Many varieties of ceramic wasters (Redmond 1979) were present in Ejutla, including misfired, misshaped, and spalled fragments. Among the pottery wasters were several hundred malformed, poorly fired, or unfinished figurines.

As we excavated and exposed the firing features, we encountered high quantities of fired clay concretions. These small amorphous and roughly formed fired-clay lumps with heavy concentrations of sand and grit were not potter's clay that was accidentally fired, nor were they obvious partially formed wasters. Rather, they appeared to be remnants of temporary earthen roofs placed over the firing pits (e.g., Stark 1985, 176). Roofs over the firing features would have been necessary to produce the reduced grayware vessels that were prevalent at Ejutla, including numerous gris wasters that we recovered in and near the excavated house.

In this chapter, we present the material evidence for ceramic production at Ejutla. We draw on comparisons with the ceramic assemblages from the other sites we excavated in the valley, as those findings are relevant for supporting our interpretation of high-intensity production (see Costin 1991) for exchange in a residential context at Ejutla (Feinman and Nicholas 2000, 2007b). We then provide an expanded discussion of the pit kilns, their contents, and an experimental study that was carried out at the University of Wisconsin to broaden the interpretive perspective for the archaeological firing features at Ejutla (Balkansky et al. 1997; Feinman and Balkansky 1997). We end the chapter with a discussion of the large figurine assemblage at Ejutla, describing both the production evidence and the range of figurine forms crafted at the site, and key differences between the Ejutla figurine assemblage and those from other Classic period sites in the Valley of Oaxaca (Feinman and Nicholas 2019b; see Appendix 4). Although we present and integrate a variety of evidential sources, the principal goals of this chapter are to document ceramic production, to situate those activities immediately proximate to the domestic unit under study, and to illustrate that some of the pottery products from this context, though mostly locally distributed, were consumed beyond the occupants of the house and the settlement in which it was situated.

7.1. Material Evidence for Ceramic Production at Ejutla

An early indicator for ceramic production in the excavated context at Ejutla was the unusual abundance of figurines in and around the exposed structure, associated with midden contexts, and in the firing features. Fired-clay figurines and whistles are common components of ceramic assemblages at Classic period sites in Oaxaca (Feinman and Nicholas 2019b), and they are often recovered in domestic contexts. Most of the figurines at Ejutla fit within typical classes of Late Classic period Zapotec figurines that include females wearing a range of garments and headdresses, and warriors wearing cotton armor and sporting staffs and shields (Appendix 4, see Figure 4.51). The routine recovery of these and other Oaxaca figurines in domestic contexts underpins the strong inference that they were used in household ritual (e.g., Marcus 1998). But the quantities at Ejutla were anomalous. In total, we recovered 2005 figurines and fragments from the excavations. Why was one household associated with so many figurines? There was great repetition in the represented imagery; the most common forms were molded, full-body warriors wearing a loincloth and females wearing a plain garment (Table A4.1; Feinman and Nicholas 2019b). The great majority were broken at the neck. The detached heads include warriors sporting a variety of headgear and women wearing braided headdresses. Less common were small, modeled human and animal forms, a few of which were complete (see fuller discussion in section 7.7).

Approximately 11% of the figurines were defective in one way or another, including misfired and misshaped fragments. Others had cracked or exploded during firing (Table 7.1, Figure 7.1). Another subset was poorly

Table 7.1. Figurine wasters in the ceramic assemblage at Ejutla.

Defect	Female #1 (braided headdress)	Female #2 (intricate headdress)	Indeterminate	Indeterminate anthropomorph	Male/ warrior	Miniature anthropomorph	Modeled animal	Whistle (globular)	Total
Firing error									
overfired	3	–	5	6	10	–	–	1	25
poorly fired/ misfired	7	–	9	16	10	–	2	2	46
exploded/ cracked	3	–	7	10	10	1	1	2	34
misshaped/ distorted	1	–	2	8	1	–	3	–	15
miscellaneous error	–	–	2	8	–	–	–	–	10
Production error									
poorly formed/ impressed	2	–	19	6	–	1	1	–	29
unfinished	–	1	24	18	4	1	1	1	50
large inclusion	1	–	2	3	–	–	–	–	6
Total	17	1	70	75	35	3	8	6	215

Figure 7.1. Sample of figurine head and torso wasters.

Figure 7.2. Poorly impressed (top) and burnt figurines (center and bottom).

formed or insufficiently impressed during production, or they may have accidentally been fired before they were finished (Figure 7.2). Many other usable figurines (~half of the assemblage) were not well fired and were eroded with indistinct imagery (Figure 7.3). In all, the defective figurines account for over 20% of all pottery wasters at Ejutla, a seemingly high percentage for a context of domestic production. The number of figurines, and especially the proportion of defective figurines, both seem highly anomalous if production was self-sufficient, geared only for consumption by household residents. Earlier models of craft production would have presumed (e.g., van der Leeuw 1977; Santley et al. 1989) that domestic production was not linked to specialization or exchange, but these findings were instrumental in challenging prior expectations.

The other 778 pottery wasters comprise a range of vessel forms, mostly utilitarian bowls and jars but also sahumadors, comals, effigy vessels, and associated appliques (Table 7.2). The proportions of pottery wasters by paste and form largely match the overall ceramic assemblage. Over half of the wasters are from gris vessels, and the majority of gris wasters identified to form are bowls. Approximately 30% of the wasters are café paste, mostly from jars. Wasters from comals and most of the sahumadors are also café paste. A small quantity (~2%) are from amarillo vessels, mostly bowls and cylinders, which generally ranged in surface color from tan to orange. Many wasters, though, were too malformed, twisted, or partial to identify the form. The defective pieces include a diverse array of misshaped/warped, misfired, and poorly finished vessels (Table 7.3, Figure 7.4, Figure 7.5), often with spalled or exploded surfaces or poorly attached appendages (Figure 7.6). Many vessels broke or cracked across large air bubbles or large inclusions, or were vitrified or honeycombed (Figure 7.7, Figure 7.8). In some instances, unfinished blocks or lumps of clay were fired (Figure 7.9); in others, fingerprints had not been smoothed out before firing and were still visible (Figure 7.10). In addition, a sizable proportion of ceramics at Ejutla, and particularly those deposited near the pit features, were fire-clouded, multitoned, or misfired (mostly oxidized graywares) but still usable (Figure 7.11). Without formal updraft kilns, the Ejutla artisans did not have precise control over the firing process (Feinman and Balkansky 1997, 136), and they produced higher quantities of lower-fired café paste vessels than did ceramic producers in the center of the valley (Feinman and Nicholas 2001b, 142). The Ejutla potters often produced certain vessels in café paste that typically were made in gris (e.g., large cooking jars) or crema paste (e.g., small bowls and jars with red paint washed on the surface or post-fire scratching) in more central locations in the valley (Figure 7.12).

Mixed with the domestic trash were 70 ceramic *moldes* (or flat plates) that were used to turn or revolve clay vessels while forming them in the absence of a potter's wheel (Figure 7.13) and 74 ceramic molds. Domestic potters in Oaxaca still employ moldes or revolving platters (Thieme 2009, 22) to fabricate clay vessels. The molds were utilized to make a variety of ceramic forms (Figure 7.14). Some of the clearest molds (17) were for figurines, and another six appear to have been used to make appliques to append to effigy vessels, including feathered headdresses (Figure 7.15), a technology that had not been employed prior to the Classic period. Most of the molds were broken and fragmentary, but several molds match figurine forms common in the Ejutla figurine assemblage. One large mold for a figurine head was intact and closely matches several heads with braided headdresses in our collections (Figure 7.16). One complete mold for a small figurine also matches a figurine recovered on site (Figure 7.17). A small figurine we made with the mold is a close match for the prehispanic object.

Like the figurines, the Ejutla potters appear to have crafted ceramic spindle whorls. The spindle whorls were fabricated in two basic ways, by modeling and firing the clay objects or by abrading repurposed vessel fragments

Figure 7.3. Heavily eroded figurine fragments.

Table 7.2. Other ceramic wasters by general form and paste.

Form*	Amarillo	Café	Gris	Unidentified	Total
bowl	1	38	166	13	218
comal	–	6	–	–	6
jar	3	80	109	32	224
plate	–	2	–	–	2
sahumador	1	28	6	–	35
support	2	6	22	10	40
tecomate	1	2	11	–	14
unknown	6	77	104	30	217
urn	–	2	18	2	22
total	14	241	436	87	778

* see Table 7.1 for figurine wasters.

Table 7.3. Firing and production errors observed in the ceramic assemblage at Ejutla.

Firing error	Quantity
bubbled, cracked	29
exploded	61
misfired	142
misshaped	219
pock marks	25
spawled	42
vitrified	2
unclear	44
Production error	
large inclusion	17
poorly attached	61
poorly finished	135
Total	**778**

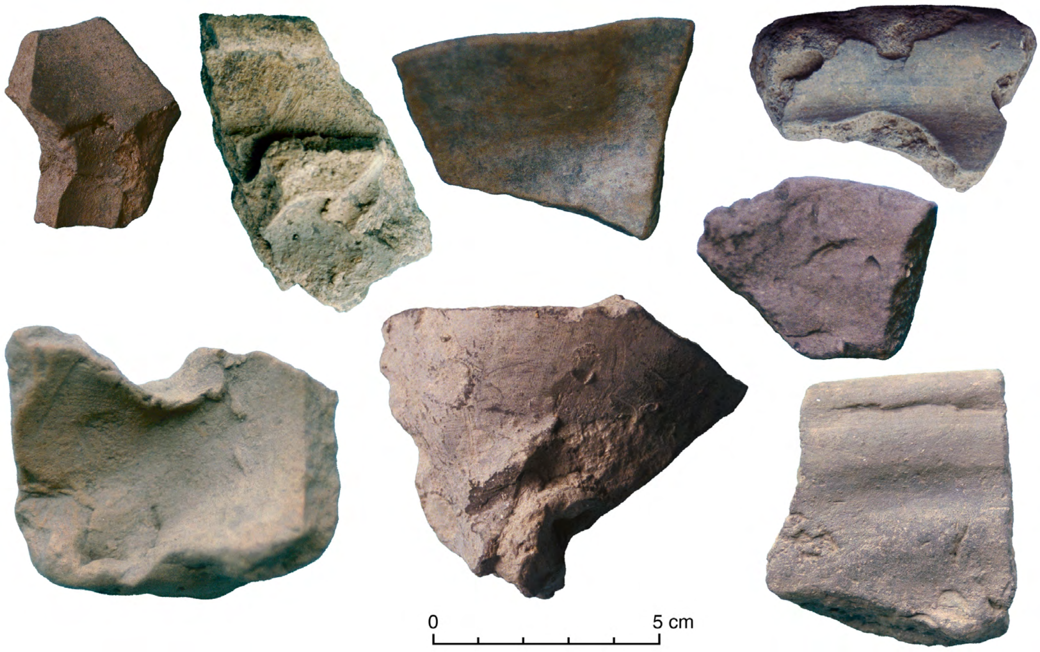

Figure 7.4. Misshaped and warped ceramic wasters.

Figure 7.5. Poorly finished vessel fragments.

(Carpenter et al. 2012). Approximately 70% of the Ejutla whorls were modeled and perforated while the clay was still wet. These modeled whorls have two basic forms, small spherical (bead-like) whorls (e.g., Kent 1957; O'Neale 1945) and flatter, disk-like whorls (e.g., Brewington 2000). The latter have a characteristic lip around the central perforation (Figure 7.18). The other 30% of the whorls were made by abrading a broken sherd into a disk, most often a jar body, and drilling a hole (usually biconical) in the center of the fragment (Figure 7.19). These abraded whorls are generally slightly concave and often referred to as a centrally perforated sherd disk (Halperin 2008, 115).

The presence of several failed spindle whorls (one spherical and two modeled disk whorls) and ceramic disks that appear to be prepared but unperforated whorls links the Ejutla potters to the crafting of the modeled whorls (Figure 7.20). Most of the spindle whorls that we collected at sites near Ejutla during the earlier regional survey also are modeled, both spherical whorls and disk-like whorls, like those at Ejutla (Table 7.4). Although the whorls have

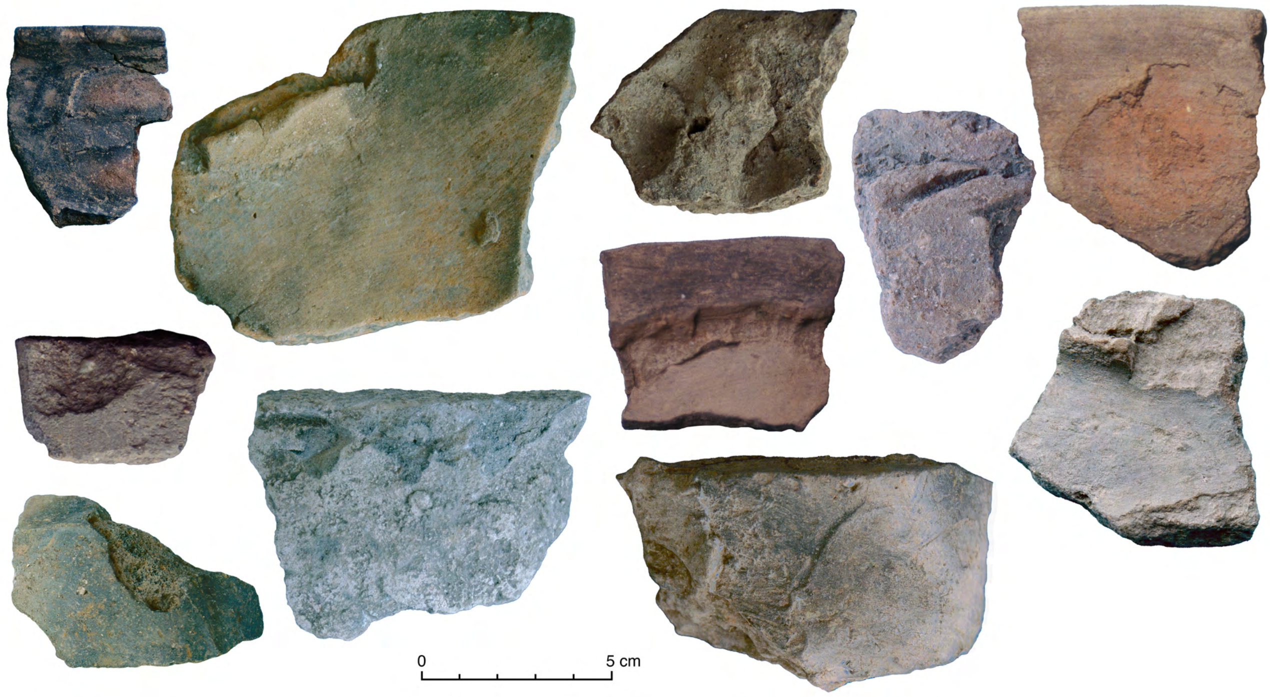

Figure 7.6. Spalled and exploded wasters.

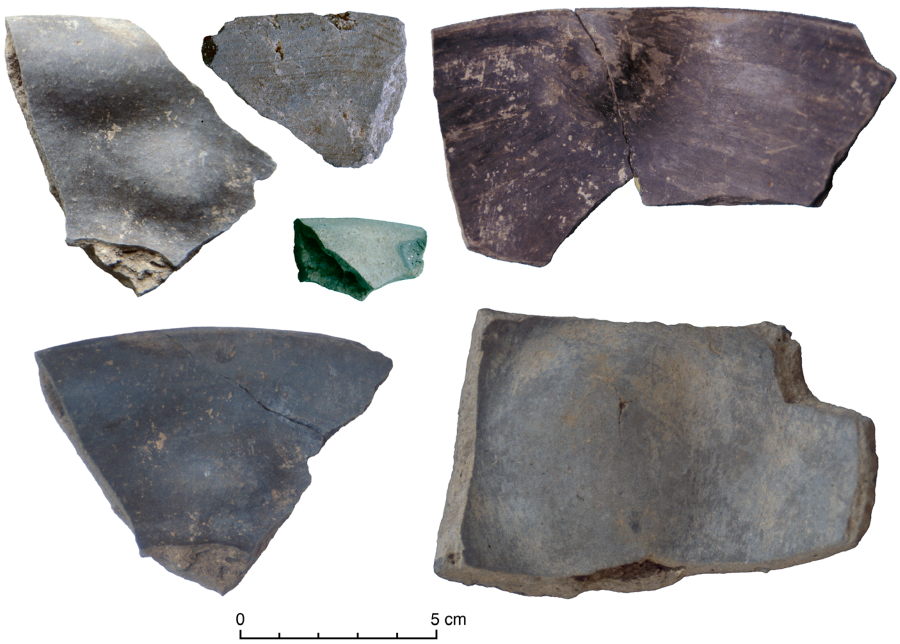

Figure 7.7. Ceramic wasters with large air bubbles and cracks.

not been chemically analyzed, it seems probable that they were made in Ejutla for exchange. Yet the Ejutla potters made some for their own use and repurposed broken vessels into abraded disk whorls as well.

In addition to the material evidence, ceramic production at Ejutla is indicated by compositional analyses of local clays that link them to archaeological vessels from the site. Petrographic analyses of raw clays taken from the current site surface and a sample of figurines and other coarse-paste vessels recovered from the excavations, including jars, bowls, molds, sahumadors, and comals, revealed the raw clays to be qualitatively (mineralogically) similar to the pastes of the archaeological vessels (Carpenter and Feinman 1999). Because the coarse-paste vessels require minimal processing, their petrographic signatures were similar to those of the raw clays. In contrast to the figurines and other coarse-paste vessels, which often have large inclusions, some locally produced ceramic bowls from Ejutla were made with processed clays that are significantly finer

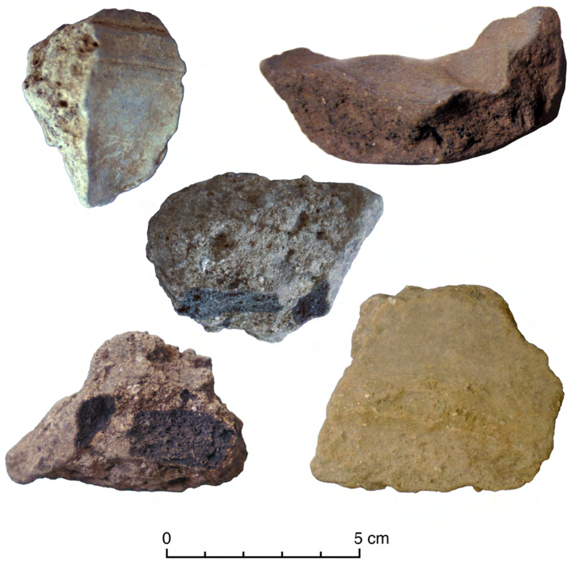

Figure 7.8. Vitrified and honeycombed wasters.

Figure 7.10. Pottery wasters with finger impressions.

than the available raw clays. To test whether those vessels were made from the same local clays, Andrea Carpenter (Carpenter and Feinman 1999) experimentally beat and levigated the raw Ejutla clays, fired test tiles made from the resultant finer pastes, and then chemically (using inductively coupled plasma mass spectrometry, or ICPMS) analyzed the test tiles and a sample of archaeological vessels. The chemical composition of both reduced fine-paste bowls and oxidized coarse-paste jars from Ejutla were found to be within the range of variation of the test

Figure 7.9. Fired clay blocks and lumps.

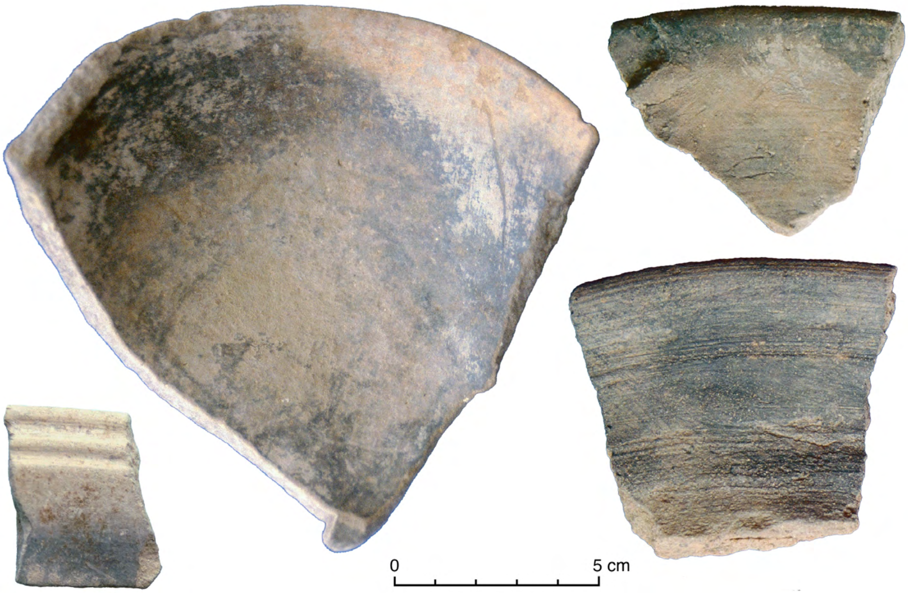

Figure 7.11. Fire-clouded bowl rim fragments.

Figure 7.12. Café paste sherds with post-fire scratching that is more typically found on crema vessels.

Figure 7.13. Ceramic *moldes*.

tiles. The experimental specimens bracketed the ancient sherds, strongly indicating that all of the latter were made using the local Ejutla clay.

Together, the petrographic, chemical (ICPMS), and experimental analyses confirm that the prehispanic potters of Ejutla had the knowledge to refine and process locally available clays to make a diverse assortment of ceramics. In this domestic context, they produced a range of oxidized coarse-paste vessels and figurines as well as reduced fine-paste bowls (see also Feinman et al. 1989). Petrographic analysis also helped address the question of why we found so many figurines during the excavations. Some proportion of them were produced for exchange. Nearly identical figurine forms were noted in surface collections that we made at several sites within 10 km of the Ejutla site during the earlier Ejutla Valley settlement pattern survey (Figure 7.21). Through petrographic analysis, one of those figurines was found to be a compositional match to the identical figurine forms recovered during our excavations (Feinman 1999, 92; Feinman and Nicholas 2001b, 140). Another figurine in *Urnas de Oaxaca* (Caso and Bernal 1952, figure 453c) that is attributed no more specifically than to Ejutla is a near match for the most complete mold that we found in the excavations almost 40 years later (see Figure 7.16).

Figure 7.14. Ceramic molds.

Figure 7.15. Ceramic molds for making figurines (warrior torso and head) and urn appliques, including feathers.

Several ceramic vessel forms that were rare at Ejutla nonetheless also may have been made at the site. Two forms appear to be distinct to Ejutla (or to sites in the southern part of the Valley of Oaxaca) as they were not present at any of the archaeological contexts we excavated in Tlacolula, nor were they represented in the collections reported from Monte Albán (Caso et al. 1967). These vessel forms include café bowls (sahumadors or braziers) with large medallion appliques and rope appliques on the rim, for which we also recovered several possible molds (Figure 7.22, see also Figure 5.28). Another uncommon form was an amarillo cylinder with a depressed band below the exterior rim; on some vessels an applique band is situated above the linear depression (Figure 7.23).

We found small numbers of amarillo vessel fragments with exterior carving, mostly associated with contexts early in the occupational sequence. For the most part, these particular bowl and cylinder fragments were made in small quantities, a finding supported by the presence of amarillo vessel wasters in the domestic ceramic complex of this house. One cylindrical vessel has an incised band of small slanted ovals on a bolstered rim; another cylinder has a band of deep crosshatching below the exterior rim (Figure 7.24). A third, thin-walled cylinder with crude geometric carving is heavily fire-clouded and may have been a waster. One amarillo bowl that was broken into many fragments, but almost complete, has deep curvilinear carving (Figure 7.25).

Other rare vessels include spouted jars like those we found in the high-status residences at El Palmillo, so the Ejutla residence would not appear to be low status. All the jars at El Palmillo were made in gris paste, while both gris and amarillo spouted jars were present at Ejutla (Figure 7.26). It is not clear whether the Ejutla potters made these jars mostly for exchange and that is why they were rare on site, or whether they obtained them through exchange. Another rare form are sahumadors with an animal effigy (possibly a feline) on the rim of the bowl (Figure 7.27 top), similar to one example at Monte Albán (Caso et al. 1967, figure 334b); in another example the effigy is on the end of the handle.

Although we found few brazier supports (Figure 7.27 bottom left), we suspect these utilitarian implements were also made locally; two elongated supports appear to be from the same brazier, while one broader and shorter brazier support is the same form as a rare single object from the excavations at Miahuatlán (Markman 1981, plate 17). An unusual support in the form of an animal's head looks like a mouse (Figure 7.27 bottom center). A final rare ceramic object is shaped like a phallus (Figure 7.27 bottom right; see Joralemon 1974, 65, figure 11); the piece is not broken, so it is not clearly a handle or support, and its use is unclear.

7.2. Comparison with Excavated Classic Period Sites

Compared to the other Classic period contexts we excavated in the Valley of Oaxaca, Ejutla stands out in terms of the overall volume of ceramics and the various indicators of ceramic production detailed in section 7.1 (Table 7.5). Only on the lower terraces at El Palmillo did we find a possible firing feature (it was much smaller than those at Ejutla) (Feinman and Nicholas 2004a, 176, 2007d; Haines et al. 2004). We did not excavate any firing features during our investigations at Lambityeco (Feinman et al. 2016), but given wasters and other ceramic evidence of production that we recovered in the excavations, ceramic

Figure 7.16. Complete ceramic mold for a figurine head with braided headdress.

Figure 7.17. Complete ceramic mold for a small figurine (center), with a matching figurine from Ejutla (right) and a figurine that we made using the same mold (left).

production may have occurred nearby. During earlier excavations in other parts of the site, ceramic production was documented as an important economic activity at Lambityeco (Lind and Urcid 2010; Payne 1970; Peterson 1976).

We base our comparisons among the sites and houses on rim sherds and other diagnostic, decorated, or otherwise significant pottery fragments and do not include nondiagnostic body sherds (which comprised over 70% of the Ejutla ceramic assemblage). Given the different

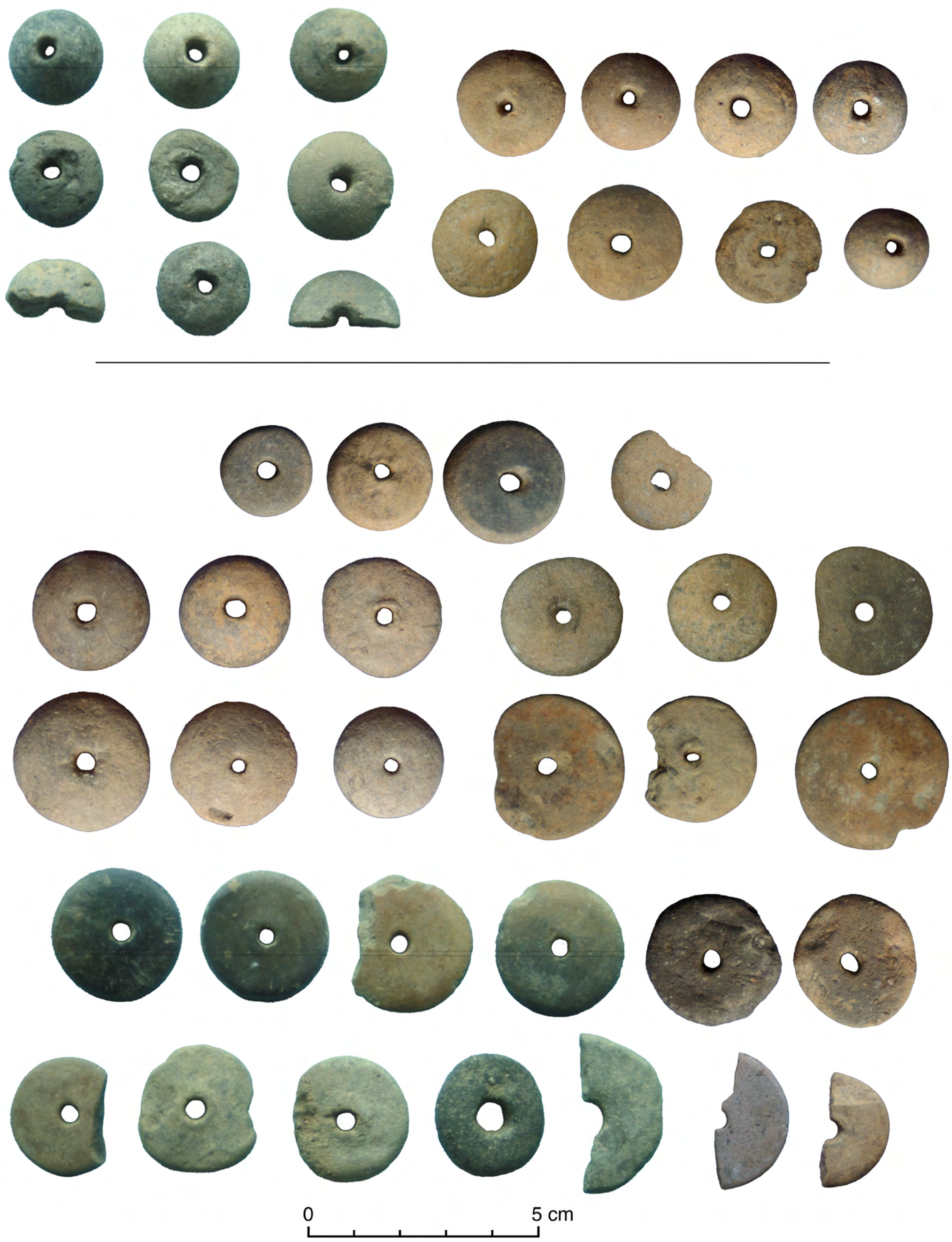

Figure 7.18. Modeled spherical (top) and disk-like spindle whorls (bottom).

number of houses excavated at the four sites, we compare per-house quantities, even though, in all cases, the totals for all eight residences at El Palmillo and all three at the Mitla Fortress are lower than for one house at Ejutla.

Per residence, the volume of ceramics at Ejutla was three to six times greater than at El Palmillo and the Mitla Fortress (see Table 7.5). Differences in the quantity of ceramic figurines were even greater, with 10–20 times as many figurines at Ejutla than in domestic contexts at either El Palmillo or the Mitla Fortress. The higher quantities of ceramics and figurines at Lambityeco reflect their use in public rituals hosted by priests who resided in the domestic structure on Mound 165 (Feinman and Nicholas 2019b) (differences in the figurine assemblages at the four sites are discussed in section 7.7 and more fully in Appendix 4). Pottery wasters, defective figurines, molds for a range of vessels including figurines, and moldes also are much more abundant at Ejutla, both in raw numbers and as proportions of the ceramic assemblages. The one context that stands out from the others beyond Ejutla is the lower group of houses at El Palmillo. As a proportion of the ceramic assemblage at each site, pottery wasters comprise approximately 1.8% at Ejutla and 0.8% on the lower terraces at El Palmillo. For all other contexts the proportions are between 0.3% and 0.4%. The presence of at least one small firing feature

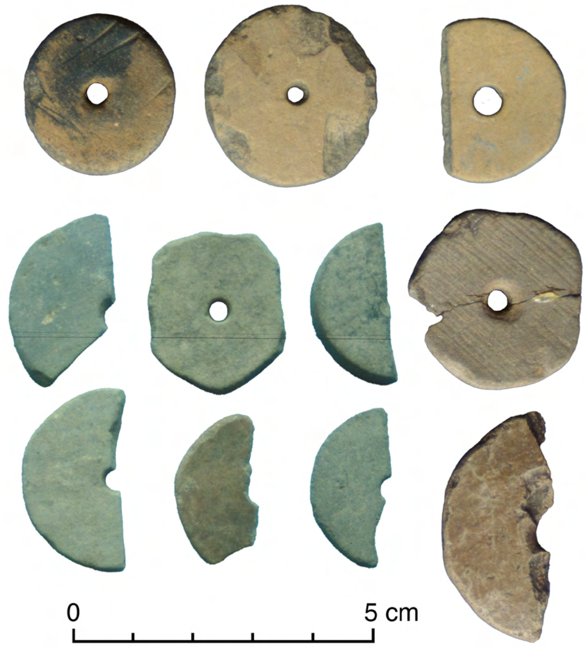

Figure 7.19. Abraded spindle whorls.

Figure 7.20. Spindle whorl wasters (top) and unperforated, unfinished sherd disks.

on a lower terrace at El Palmillo accords with the higher proportion of ceramic production indicators in that context relative to the other non-Ejutla contexts. The low numbers of material indicators of pottery manufacture that were recovered from the other excavated houses compared to Ejutla would indicate that those households either did not make pottery or only engaged in low-intensity production for immediate use. In contrast, the much higher quantities of all indicators associated with one residence at Ejutla support the argument that high-intensity ceramic production for exchange occurred in that context (Feinman 1999; Feinman and Nicholas 2000, 2004a).

Spindle whorls of all three size categories (see section 5.3.1) are present at El Palmillo, the Mitla Fortress, and

Table 7.4. Abraded and modeled spindle whorls* at Ejutla (excavation and survey), Lambityeco, El Palmillo, and the Mitla Fortress.

Site	Context	Abraded	Modeled total	Modeled disk	Spherical	Total
Ejutla excavation	–	32	77	42	35	109
Ejutla regional survey	–	3	9	5	4	12
El Palmillo	lower 3 terraces	44	1	–	1	45
El Palmillo	middle 2 terraces	27	4	4	–	31
El Palmillo	upper 2 residences	67	19	19	–	86
El Palmillo	top (Platform 11)	18	8	8	–	26
Mitla Fortress	3 houses	28	7	6	1	35
Lambityeco	M165	25	15	15	–	40

Site	Context	Abraded	Modeled total	Modeled disk	Spherical
Ejutla excavation	–	29.4%	70.6%	38.5%	32.1%
Ejutla regional survey	–	25.0%	75.0%	41.7%	33.3%
El Palmillo	lower 3 terraces	97.8%	2.2%	–	2.2%
El Palmillo	middle 2 terraces	87.1%	12.9%	12.9%	–
El Palmillo	upper 2 residences	77.9%	22.1%	22.1%	–
El Palmillo	top (Platform 11)	69.2%	30.8%	30.8%	–
Mitla Fortress	3 houses	80.0%	20.0%	17.1%	2.9%
Lambityeco	M165	62.5%	37.5%	37.5%	–

* Quantities are totals for all residences in a site sector (El Palmillo) or site (Mitla Fortress).

Spindle whorls were collected at 10 sites during the Ejutla regional survey.

Figure 7.21. Figurines from other sites in the Ejutla Valley that were collected during the regional survey.

Lambityeco, as well as at Ejutla (Table 7.6; Carpenter et al. 2012, 391; Feinman and Nicholas 2012, 245), albeit in different proportions that in part reflect access to specific fiber resources. Larger and medium spindle whorls are more appropriate for spinning coarse fibers, such as from the fronds of maguey, which is an abundant genus in eastern Tlacolula, whereas the smaller whorls would have been used on cotton and other fine fibers. What stands out about the Ejutla whorls is the number associated with one house and the formality of the whorls compared to the other sites. The Ejutla household had twice as many spindle whorls as any residence at the other sites. In addition, most of the whorls at those sites are the abraded variety made from repurposed vessel fragments, even on the lower terraces at El Palmillo where some ceramic production was carried out, whereas most of the spindle whorls at Ejutla are modeled (see Table 7.4). Spindle whorls are only one of a number of tools, including a range of bone tools (Feinman et al. 2018b), that were used to process fiber into thread. All of these were recovered with frequency from all three Tlacolula Valley sites (Feinman and Nicholas 2012, 2016b). Possibly due to lack of access, the Tlacolula fiber workers more often made their own more expedient whorls from ubiquitous ceramic sherds. The residences at the top of El Palmillo had greater proportions of modeled disk whorls (~30%). Whether those whorls were made elsewhere at El Palmillo or were traded from a site like Lambityeco, where there also were higher quantities of modeled whorls, is unknown, but in a trace element analysis of Classic period pottery in the Valley of Oaxaca (Minc et al. 2015), approximately 18% of utilitarian pottery sampled from El Palmillo was produced farther to the west in the central part of the Tlacolula Valley. Although the ceramic objects produced by the Ejutla potters were exchanged beyond their barrio and to their closest neighbors in the southern end of the valley, they do not appear to have been exchanged as far as the eastern arm of the valley (Minc et al. 2015).

7.3. The Pit Kilns

As we were finding evidence of shell working in and around the house and middens, we were also finding multiple indicators of ceramic production, as outlined in section 7.1. The close proximity of the production debris to the house tied both of those activities to the residents of the prehispanic structure. Yet although more than half of the pottery wasters at Ejutla were from gris paste vessels (see Table 7.2), which require a reducing (low oxygen) atmosphere, we had no remains of obvious kilns, like the

Figure 7.22. Café medallions and molds (two in upper left).

Figure 7.23. Amarillo cylinders with a depressed or appliqued band below the rim.

Figure 7.24. Other unusual amarillo vessels at Ejutla have a band of small slanted ovals (top), broad panels of crosshatching (center), and other carved designs (bottom).

Figure 7.25. Potsherds from one carved amarillo bowl that was found broken in situ (the two sherds on the right are from different but similar vessels).

Figure 7.26. Spouted jars from Ejutla that are similar to ones on high-status residences at El Palmillo.

two-chambered updraft kilns at Atzompa and Monte Albán (Payne 1982; Winter and Payne 1976). Those more formal kilns were built of stone and mortar and had separate chambers for the fire and the wares, and the Ejutla pit kilns were not like the updraft kilns at Atzompa (Mendoza Escobar 2014), Monte Albán (Winter and Payne 1976), or Macuilxochitl (Faulseit et al. 2016; Winter et al. 2007). Other less substantial firing features at Monte Albán were simple updraft kilns dug into the bedrock (Markens and Martínez López 2009), and elsewhere in Oaxaca indirect-firing kilns have two horizontal chambers separated by a flue or wall (Flannery and Marcus 1983, 299; Whalen 1981, 97). Given the ubiquity of pottery in Mesoamerica, archaeologically documented kilns are rather rare (e.g., Payne 1970; Santley et al. 1989; Stark 1985). In their absence, Mesoamerican archaeologists have generally relied on other material correlates of pottery production, such as anomalous densities of potsherds and specific ceramic types, clay concretions, ash lenses, and wasters (e.g., Feinman 1980, 1982; Krotser 1987; Redmond 1979; Stark 1985), to identify loci of production. These criteria, however, are indirect measures that are subject to equifinality, such that each cannot be taken alone as a definitive indicator of ceramic production (Feinman

Figure 7.27. Unusual and rare ceramic forms include sahumador rims and handles with animal effigies (top rows), brazier supports (bottom left), an animal support (bottom center), and a fine-paste ceramic object shaped like a phallus (bottom right).

Table 7.5. Ceramic production indicators at Ejutla, Lambityeco, El Palmillo, and the Mitla Fortress.*

Category	Ejutla house	El Palmillo lower (per house)	El Palmillo middle (per house)	El Palmillo upper (per house)	Mitla Fortress (per house)	Lambityeco M165
Ceramic rims and diagnostics	57092	14666	15805	18636	8494	27000
Figurines (excavation only)	2005	111	139	168	188	1770
Fig wasters	215	8	7	10	4	9
Other wasters	778	105	42	38	26	80
Total wasters	993	113	49	49	30	89
Total molds	74	13	16	1	5	12
Molds for figurines	17	1	2	–	3	11
Moldes	74	3	1	1	1	12
Concretions	1035	8	5	3	1	4
Spindle whorls (ceramic)	109	15	15	37	12	40
% urns in café paste	40.0%	12.1%	5.9%	9.9%	0.3%	7.4%

* For El Palmillo the listed amounts are the average for the residences in each site sector; for the Mitla Fortress they are the average for 3 residences.

Table 7.6. Spindle whorls of different sizes at Ejutla (excavation and survey), Lambityeco, El Palmillo, and the Mitla Fortress.

Context	Large (>29 g)	Medium (8–29 g)	Small (<8 g)	Indeterminate	Total
Ejutla excavation	–	19	83	7	109
Ejutla regional survey	–	2	10	–	12
El Palmillo	19	102	71	2	194
Lambityeco	3	35	17	–	55
Mitla Fortress	6	17	13	–	36
Total	28	175	194	9	406

and Balkansky 1997; Stark 1989). Although a range of archaeological indicators are recoverable to identify pottery production, the case is always stronger when we can marshal multiple lines of evidence.

What we did find under the middens and even below the house were shallow pits that the ancient Ejutleños had dug into the soft bedrock (see Figure 4.1). There were no stone or adobe walls associated with these bedrock features, but, as we outlined briefly in chapter 4, they had other characteristics that indicated they were used to fire pottery. The features were slightly asymmetrical, with a narrowing of the depressions into what appears to be a stoke pit, or mouth, to add fuel and ventilate the kiln (see Figures 4.19–4.21). The levels below the middens that were in direct association with the bedrock pits held a more restricted artifact complex, largely limited to ash, ceramic wasters, clay concretions, a few rock cobbles, burnt bedrock, and potsherds. The layers of ash, charcoal, and burnt bedrock could be from other firing activities, but the shape of the features, the quantities of wasters, spacers, large broken but unused vessels that appear to have been used as kiln furniture, and high quantities of specific vessel forms in and around the firing features pointed to ceramic production, using the bedrock depressions as pit kilns. In addition to the large number of defective sherds and pottery byproducts, many broken but unused ceramic vessels and the most abundant ceramic varieties—especially molded figurines, sahumadors, comals, and certain types of reduced (gris) bowls—were more localized in and adjacent to the pit features than were other ceramic categories (Feinman and Nicholas 1994).

The pit features and surrounding deposits at Ejutla also had high quantities of amorphous clay concretions (Figure 7.28). Similar ‘amorphous clay lumps’ or ‘numerous fire-hardened fragments of loam’ (with grass imprints) in pit deposits containing dense layers of ash, charcoal, ceramic wasters, and figurines at the Peñitas site in Nayarit, Mexico, have been interpreted as the remains of an impermanent earthen cover or roof that was placed over the firing pits (Bordaz 1964). Sheehy (1992, 768–69) argues that ephemeral firing features at Tlajinga 33 at Teotihuacan may have served as pit kilns, as described in ethnographic accounts of potters in South Asia (Rye and Evans 1976, 165–66); the term has since been applied more broadly (e.g., Heacock 1995; Rice 1987, 158). These are not true ceramic kilns, in that they do not separate the fuel from the wares (e.g., Rhodes 1968, 11). Rather they are a less costly option for intermittent producers.

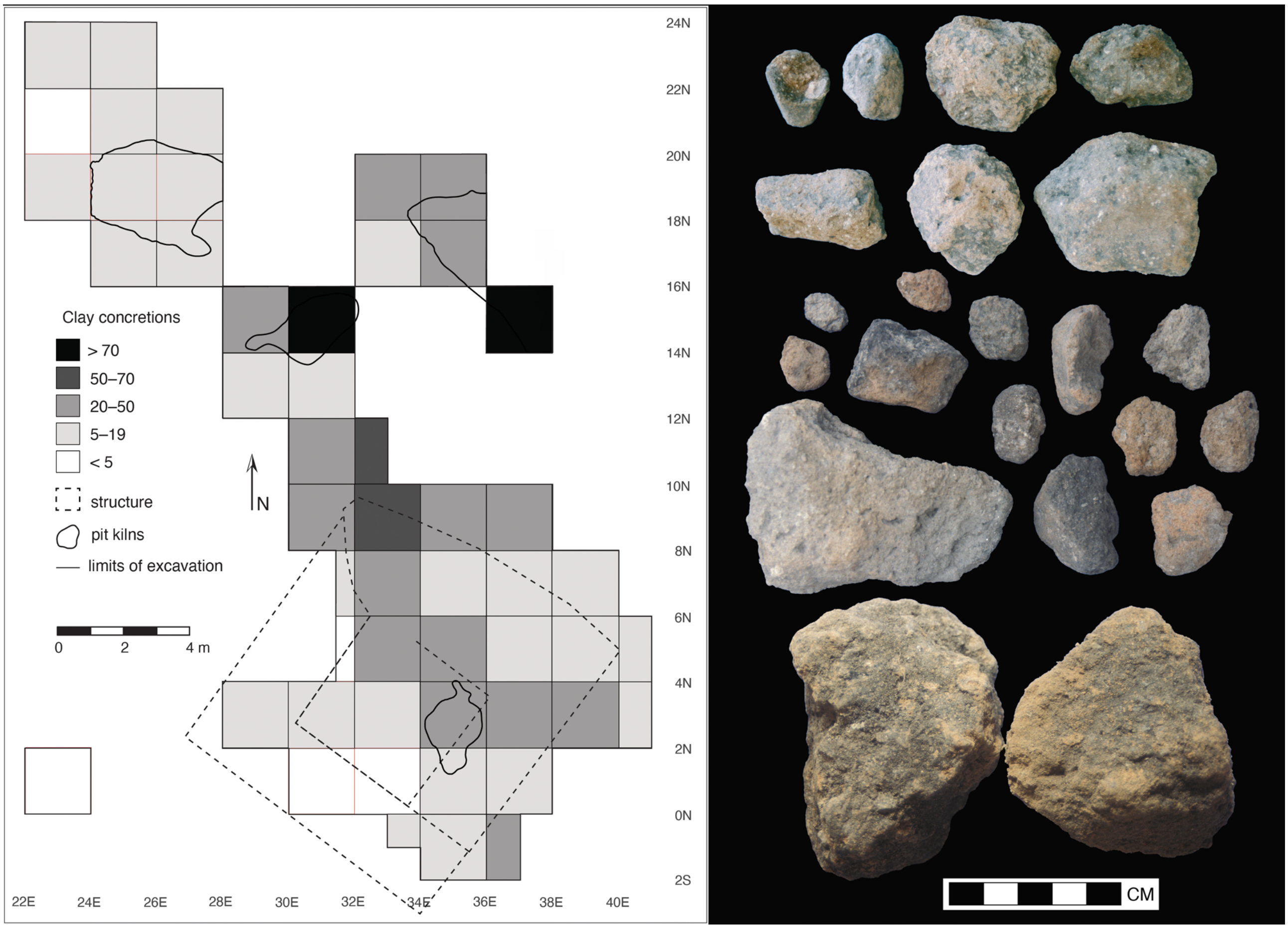

Figure 7.28. Clay concretions and map of clay concretion distributions in the excavated area.

Based on the nature of the firing features at Ejutla and their associated artifactual remains, the Ejutla potters used these depressions as pit kilns to fire pottery.

Reduced grayware vessels are prominent in the prehispanic ceramic tradition of the Valley of Oaxaca (Caso and Bernal 1965), and they are the dominant ware in the Ejutla ceramic collections (including pottery wasters). But based on the nature of the full excavated ceramic assemblage from Ejutla, the site's potters did not have the control over firing in pit kilns that would have been expected with updraft kilns (Balkansky et al. 1997, 150–51). The paste of many sherds had more or less sharp boundaries between the surface and the core, indicating they were fired in a poorly controlled firing atmosphere in which maximum temperatures were sustained only for short periods of time (Balkansky and Crossier 2009; Rice 1987; Velde and Druc 1999). Misfired sherds were common. For example, most figurines were oxidized café, but a small number appear to have been reduced accidentally. Similar inconsistencies in coloration were evident for most of the forms produced by the Ejutla potters. We found multitoned and fire-clouded vessels with regularity (see Figure 7.11). Frequent firing errors of these sorts are the likely consequence of direct-fuel firings, as would occur in pit kilns, where fuel and vessels are not completely separated (Vitelli 1993, 207).

There also were relatively high quantities of café pottery in the Ejutla excavations (~40%) compared to the other Classic period contexts we excavated (Table 7.7). The El Palmillo lower terraces (the context with the pit kiln) also had slightly higher quantities of café pottery. In addition, Classic period effigy vessels in Oaxaca are most often made of gris paste, but a much higher proportion in Ejutla are café (see Table 7.5). Café vessels are generally low fired in aboveground and open firings (Balkansky and Crossier 2009). Depending on the control of air flow, they also could be fired in pit kilns.

7.4. Ceramic Firing: Experimental Analyses

To broaden our interpretive understanding of the archaeological firing features at Ejutla, we had an experimental pit kiln constructed and fired at the outdoor archaeology laboratory at the University of Wisconsin in Madison (Balkansky et al. 1997; Feinman and Balkansky 1997). There is no contemporary analog to pit firing in the Valley of Oaxaca. Today's artisans in several pottery-producing villages use updraft kilns to fire their wares (Atzompa and Coyotepec) that are transported to markets throughout the region, whereas in the remote village of San Marcos Tlapazola, in the eastern arm of the valley, the potters open-fire brownware (café) comals and bowls that are marketed much more locally (Feinman et al. 1992;

Table 7.7. Percentage of the four principal ceramic wares in the assemblages of sites excavated by Feinman and Nicholas.

Ceramic ware	Ejutla	El Palmillo lower terraces	El Palmillo middle terraces	El Palmillo upper terraces	Mitla Fortress*	Lambityeco
crema	0.52%	0.06%	0.06%	0.01%	–	–
amarillo	4.63%	14.87%	12.55%	10.27%	11.82%	6.21%
café	39.78%	31.61%	29.05%	25.04%	13.59%	20.62%
gris	55.08%	53.46%	58.34%	64.68%	74.58%	73.16%

* Site occupation extends later into the Postclassic period.

Shepard 1963). Therefore, to better match the form of the firing features at Ejutla, the design of the experimental pit kiln was modeled after ethnographic descriptions of traditional potters in India, Pakistan, and the southwestern United States (e.g., Rice 1987; Rye 1981; Shepard 1961; Sinopoli 1991). A shallow depression was dug into the ground and then lined with a layer of sand to serve as a post-excavation referent. To improve the draft, the floor of the kiln was inclined slightly, with the open end, or 'mouth,' a bit deeper than the back end of the depression. The chamber was then filled with various vessel forms (including comals and test tiles), kiln furniture (to separate the vessels and improve air flow), and fuel (cow dung, grasses, and tree branches). The mixture of pottery and fuel was then covered with straw to form a matrix on which mud plaster was spread to construct the roof.

The mud plaster roof provided structure to limit damage wrought by the shifting of pots as the fuel was consumed and insulation to conserve fuel and better control the temperature and firing atmosphere. Atmospheric conditions in the pit kiln could be modified throughout the firing, by opening air holes in the mud plaster dome to maintain an oxidizing atmosphere or by smothering the fire to create a reducing atmosphere. The ease with which the enclosed nature of these kilns allowed potters to smother the fire (Rye 1981, 98) would have made pit kilns well suited to producing reduced grayware vessels (Feinman and Balkansky 1997, 139).

After firing was complete, the roof was broken, and the feature was excavated. After the fired vessels were removed, the excavated experimental pit kiln left few indications that a stage in ceramic manufacturing had occurred there. Evidence was limited to a number of broken vessels damaged in the firing, a thin layer of ash mixed with charcoal, and the ground surface beneath the kiln discolored and partially baked to a depth of 1 cm. Few of these residual materials would likely survive intact on an exposed surface, but repeated use of the feature over time or rapid sealing of the deposits may have left unusual concentrations of potsherds, perhaps particular ceramics, and wasters that would resemble the contents of the ancient pit kilns at Ejutla.

The most prominent feature of the firing experiment, however, was the pit kiln's mud plaster covering. Once fired and broken, the fragments strongly resembled the clay concretions that were abundant at Ejutla (see Figure 7.28) and other pottery-making sites in Mesoamerica (Bordaz 1964; Redmond 1979; Stark 1985, 176). The 'fired adobes' so prevalent at Tlajinga 33 (Sheehy 1992) may represent the same kind of residue. Although other processes might result in similar concretion-like materials, their presence in contexts where numerous other indicators of ceramic production (including the pit kilns) have been recovered indicates that these amorphous, burnt artifacts may be all that remain from impermanent roofing.

7.5. Firing Temperature Experiment

Another aspect of the pit-kiln experiment was to measure firing temperatures. Prior to firing, four thermocouples were placed at different locations in and beneath the pit kiln to record temperatures every 15 minutes during the course of the firing. The highest temperature reached was 768 °C, and the temperature needed to make a useful pot (above ~500 °C) was sustained throughout the kiln for more than 5 hours (Balkansky and Crossier 2009, 60). To interpret these results, we compared them to firing temperatures that we observed in prior experiments on the three major grayware serving bowl varieties (G-12, G-35, and G-3M) in the Valley of Oaxaca (Feinman et al. 1989, 1990, 1992). The sherds used for the firing and other technical analyses were drawn from the surface collections made during the regional surveys of the Valley of Oaxaca and the Ejutla Valley, including from the surface of the Ejutla site itself. As we discussed in chapter 4, G-12s and, especially, G-35s were abundant at Ejutla, while the later Postclassic G-3Ms were much rarer in our excavated contexts.

The thin, hard-fired G-3Ms are much less porous (smaller proportion and size of inclusions) than the earlier G-12s and G-35s and were, on average, fired at higher temperatures (~696 °C). The mean temperature for both the G-12s and the G-35s was 664 °C, although the G-12 from Ejutla was at the low end (640 °C). The firing temperatures estimated for the prehispanic bowls fall mostly within the range of those recorded for a contemporary, open-fired San Marcos vessel (620 °C) and a kiln-fired Coyotepec pot (850 °C) (Feinman et al. 1989, table 3). Although temperatures in the well-controlled firing in the experimental pit kiln reached levels high enough to make the finer-paste G-3Ms, they were not consistent across the pit kiln or sustained over time (Balkansky and Crossier 2009, 66). The pit kilns were better suited for making the earlier G-12s, G-35s, and other coarse-ware jars and bowls and ceramic figurines that were abundant at Ejutla, both gris and café; they did not require as high a temperature, and the greater porosity provided mechanical strength to withstand firing and knocking against other vessels. These technical analyses add support for the use of pit kilns at Ejutla to fire gris and café pottery, adjusting the mud plaster covering as needed to provide or cut off oxygen.

7.6. Comparing the Pit Kilns and Their Contents

The ceramic assemblages in the pit kilns are similar to the pottery found in other contexts at the site, both in and around the house and throughout the middens; together with the petrographic analyses discussed above, they tie the firing features to the house and the domestic trash of its residents. Although the pit kilns varied in size, depth, and state of preservation, they were similar in most key respects. All were asymmetrical depressions dug in the bedrock, with a narrowing of the bedrock depression into a stoke pit, or mouth, visible in the three pit kilns that were excavated completely. The bedrock surfaces of the pit kilns were blackened from repeated firings. All the pit kilns had high densities of ash and charcoal, with basal layers of almost pure ash. In addition to large potsherds that served as kiln furniture, they all contained café and gris wasters mostly of bowls and jars, figurine wasters, concentrations of certain vessel forms, clay concretions, and other remnants of ceramic production (Table 7.8). In

Table 7.8. Principal contents of the Ejutla pit kilns.

	Pit kiln 1	Pit kiln 2	Pit kiln 3	Pit kiln 4	Pit kiln 5	Total
Vessel forms and other categories						
Café comals	13	201	408	336	164	1122
Café jars	390	126	323	281	136	1256
Café bowls	45	110	94	162	87	498
Café sahumadors	3	116	213	480	61	873
Gris bowls	162	449	1444	1072	446	3573
Gris jars	37	134	350	254	101	876
Amarillo bowls	84	21	59	59	21	244
Amarillo jars	14	4	6	2	2	28
Concretions	22	51	51	6	46	176
Figurines	12	54	144	72	19	301
Total	782	1266	3092	2724	1083	
Waster form by paste						
Amarillo						
bowl	–	–	–	–	1	1
jar	–	–	1	–	–	1
Café						
bowl	2	4	3	1	1	11
comal	–	1	1	–	–	2
figurine	4	3	21	16	4	48
jar	4	6	8	6	6	30
sahumador	–	2	4	3	2	11
support	–	–	1	–	–	1
unknown	1	3	4	2	5	15
urn	–	–	1	–	–	1
Gris						
bowl	2	7	13	8	3	33
figurine	–	–	3	–	–	3
jar	2	5	3	9	3	22
sahumador	–	–	1	–	–	1
support	–	–	1	–	4	5
tecomate	–	–	–	1	–	1
unknown	5	2	5	2	6	20
urn	–	–	2	–	–	2

most cases these distributions do not tie any one ceramic form or ware to only one pit kiln. Clay concretions were recovered, albeit in varying amounts, from all the pit kilns (see Figure 7.28), indicating that temporary roofing was applied at least occasionally in all the kilns to help control the firing and provide a reducing atmosphere when the desired product was a gris vessel. Yet there is variation among the pit kiln assemblages to indicate that certain ones may have been used to fire specific forms more often than others.

The ceramic assemblage in the pit kiln under the house (pit kiln 1, 2n34e) is the most different, largely because the pottery is from the earliest occupation of the area (see Table 4.3). The pit kiln contains several early amarillo and café forms that also are abundant in the fill below the house. Although much of the material in the fill appears to have been brought in to create a level surface on which to construct the house, some of the ceramics came from the upper levels of the firing feature that was destroyed in the process of preparing the surface to construct the residence. Among the pottery recovered in the pit kiln are early grayware vessels (G-12s) that date from the Late Formative (Monte Albán Late I), including a defective G-12 bowl rim that had exploded on the exterior (see Figure 7.8 top left). Café jars, especially raked ollas that date early in the Ejutla sequence, also are abundant in the pit kiln under the house, including several café jar wasters. Both vessel forms are prevalent in the collections from the fill under the house. Although we did not recover many figurines from pit kiln 1, several of them are wasters. There also were hundreds of figurines and dozens of wasters in fill under the house floor, so Ejutla artisans were making figurines from early in the occupation of the eastern barrio of the site.

The assemblages in the other four pit kilns include very low numbers of the same early ceramics present in pit kiln 1 (see Table 4.3), so we cannot rule out that some of those features were at least partially contemporaneous with pit kiln 1 and that firing activities also occurred in several of those pit kilns prior to the construction of the house. The evidence is best for pit kiln 5 (14n36e), which contained somewhat more early pottery than the other three (see Table 7.8). Two other data points also are strongest for pit kiln 5 and indicate that it may have come into use sometime after pit kiln 1 but before the house was built: ^{14}C dates from pit kiln 5 are slightly earlier than for pit kilns 2–4 (see chapter 4), and pit kiln 5 was impacted by the construction of pit kiln 3.

But, overall, the four other pit kilns had much higher quantities of later pottery than pit kiln 1, including G-35 vessels that date broadly to the Classic period. All four later pit kilns contained a range of Classic period gris jars and bowls, especially pit kilns 3 and 4. Wasters of some ceramic forms also were more frequently found in one pit kiln than in the others. For example, the highest quantities of gris bowl wasters were in pit kiln 3, whereas the highest number of gris jar wasters were in pit kiln 4 (see Table 7.8). And most of the G-35 bowl and G-1 storage jar wasters that we collected were associated with pit kiln 4. These distributions are more likely to represent different firing events rather than sequential use of the features.

Clay concretions were recovered in and around all the pit kilns and were abundant in the midden deposits above the four later kilns. Yet there were fewer of them in pit kiln 4 (18n24e), especially given its size (see Table 7.8), and the midden directly above it compared to the others (see Figure 7.28). It is possible that the last firing activities occurred in that pit kiln, so that more of its temporary roofing was scattered around the feature. That pit kiln also may have been used more often to fire vessels in an oxidizing atmosphere with a less substantial temporary roof, more like the open, aboveground firing in the modern village of San Marcos Tlapazola, where potters still make a range of café vessels, including comals. Indeed, we recovered more café sahumadors from pit kiln 4 than from any other firing feature, although these incense burners were recovered from all kilns. In addition, pit kiln 4 had a smaller proportion of gris vessels (see Table 7.8), which would have required a more substantial roof to fire in a reducing atmosphere. Only pit kiln 1 had more café jars than pit kiln 4. The high number of café comals that we recovered from pit kiln 3 indicates that feature was often used to make the tortilla griddles, but there also were high numbers of comals in pit kiln 4. In addition, figurine fragments and wasters were recovered from all the kilns, but the most wasters came from pit kilns 3 and 4. Based on the ceramic assemblages in each feature, all the pit kilns were used to make both reduced gris and oxidized café vessels.

In sum, a range of vessel forms, both reduced graywares and oxidized cafés, were fired in each pit kiln. The earliest feature, pit kiln 1, was covered over by the residence, while the others continued in use (possibly pit kiln 5) or were constructed in association with the residence. The later kilns do not appear to have been used sequentially, but rather were in use at the same time, often used for firing different vessel forms.

7.7. Classic Period Figurines and the Ejutla Assemblage

The Ejutla figurine assemblage is very large compared to the other domestic contexts that we excavated in the Valley of Oaxaca. The 2005 figurines and fragments from one house and surrounding middens and kilns greatly surpass the quantities at El Palmillo (total of 1168 figurines divided among eight houses and other public areas) and the Mitla Fortress (562 divided among three houses). At Lambityeco we recovered 3870 figurines and whistles associated with a residence, temple, plaza area, and ballcourt. This large assemblage is less comparable for several reasons; the figurines were mostly recovered from a civic-ceremonial area instead of just domestic contexts. More than half of the ceramic figurines at Lambityeco are large whistles that were likely used in public, as opposed to domestic, rituals (see Appendix 4). Although we did not find evidence of ceramic production during our Lambityeco excavations, which only exposed a small part of the site, pottery production was documented as an important economic activity at the site in earlier excavations (Lind and Urcid 2010; Payne 1970; Peterson 1976). Most of the figurines at Lambityeco were likely made nearby but not within the area of our excavations.

The high quantity of figurines, many of them wasters, and the presence of many figurine molds are evidence that the Ejutla potters crafted figurines in a variety of forms and representations, almost entirely in café paste (95.2%). Figurines and wasters were present throughout the excavations in almost all contexts. The highest quantities (>55%) were in the middens around and above the house and pit kilns, followed by the fill under the house (~20%). There were few in the house (~5%). They were found in all the pit kilns, accounting for approximately 18% of all figurines. Pit kiln 1 had the fewest figurines, whereas pit kiln 3 had twice as many as any other kiln (see Table 7.8).

But the anomalous nature of the Ejutla figurine assemblage beyond the evidence of production did not become clear to us until we excavated at other sites in the valley and rarely found the most common Ejutla forms of female and warrior figurines (Feinman and Nicholas 2019b). Here we describe the figurine assemblage in Ejutla in some detail and return to the larger implications for interregional interaction and exchange in the concluding section (7.8) of this chapter.

Close to 80% of the figurines were mold-made, and approximately 14% were modeled by hand. Other figurine fragments were too indistinct or deteriorated to determine the method of production. The modeled ones at Ejutla are small solid figurines that mostly represent humans (usually of indeterminate gender), but a few are animals, typically dogs, birds, and bats (Figure 7.29, animals are in the bottom row). The torsos of the modeled figurines are crudely formed and lack details. The eyes and mouth on the heads may be marked by simple punctations or small coffee bean appliques. Modeled figurines were made as early as the Formative period in the Valley of Oaxaca, but

Figure 7.29. Small modeled figurines are mostly anthropomorphic, but some represent animals (bottom row).

Figure 7.30. Finger impressions on the back of a warrior figurine head.

Figure 7.31. Figurine torsos (on the left) with remnant and complete back stands (on the right).

they continued to be made, even if in lower quantities, during the Classic period when artisans began using molds to make figurines (e.g., Feinman 2018). Modeled and molded figurines were recovered from all five pit kilns, and even in pit kiln 1 there were more molded

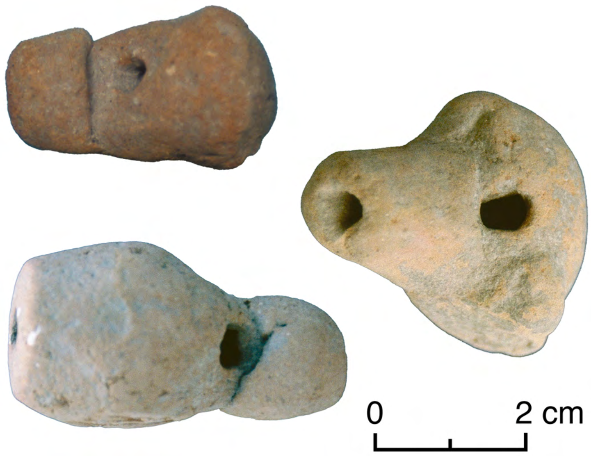

Figure 7.32. Back stands that also serve as whistles.

figurines than modeled ones. So, the new technology of using molds to make figurines was already being employed by artisans in the area prior to the construction of the house. Yet, the proportion of modeled figurines to molded ones is twice as high in the fill below the house as it is in the levels associated with the house (~23% to 13%), indicating the Ejutla artisans made more mold-made figurines through time.

The mold-made figurines typically have a flat back, sometimes with thumb- or fingerprints on the back from pressing the clay into the mold (Figure 7.30). Many of the torso fragments still have attached handles or back stands on the back, or if the handle is missing, remnants of it are still visible on the back of the figurine (Figure 7.31). These back stands allow the figurines to be placed in standing positions; the back stands are hollow, with small blow holes so that the hollow cavity could also serve as a whistle (Figure 7.32).

Two varieties of female and warrior figurines are especially prevalent at Ejutla (Table 7.9; see also Table A4.1): females clothed in a plain garment and *quechquémitl*

Table 7.9. The Ejutla figurine assemblage.

Figurine categories	Total no. of figurines	No. of wasters
Female #1 (braided headdress)	**217**	**17**
braided headdress	54	7
decorated triangular tunic	24	2
plain banded tunic	139	8
Female #2 (intricate headdress)	**4**	**1**
decorated tunic/garment/arms crossed	4	1
Female #3 (small crossed arms)	**2**	**–**
triangular tunic/braided headdress	2	–
Indeterminate	**429**	**70**
Indeterminate anthropomorph	**633**	**75**
head	93	13
indeterminate	529	61
statuary	8	–
headdress	1	–
torso	1	–
neck/torso	1	1
Male/warrior	**417**	**35**
cotton armor	58	6
feathered cape	9	–
feathered hood	50	4
helmet/turban headgear	108	8
loincloth	128	12
plain jacket	13	–
priest	39	5
tiered hood	12	–
Miniature anthropomorph	**110**	**3**
miniature warrior	20	1
miniature indeterminate	9	–
small modeled figure	81	2
Modeled animal	**91**	**8**
bird	24	2
dog	13	2
other animal	54	4
Whistle (globular)	**52**	**6**
bird/owl/bat headdress	4	–
fauces de serpiente	10	–
feathered headdress	7	1
jaguar headdress	2	1
serpent head	3	–
whistle base	4	1
whistle head	22	3
Whistle (small)	**50**	**–**
buccal whistle	1	–
feathered headdress	37	–
whistle base	12	–
Total	**2005**	**215**

(tunic) (Figure A4.3c) and warriors wearing a loincloth, usually undecorated (Figure A4.7h). Most of the female heads have a braided headdress; most of the warrior heads sport a helmet or turban-like headgear. These varieties were recovered from all the later pit kilns, although with greater frequencies in pit kiln 3. Only a few loincloth fragments and one braided headdress were found in pit kiln 1, but there were many heads and bodies of both the female and the warrior in the fill below the house, so they were also being made in the area prior to the construction of the house.

Several variations of the females and warriors at Ejutla appear to have been made with the same set of molds, although we did not find any complete torso molds for these figurines. But one complete full-body figurine mold (see section 7.1, Figure 7.17) is almost a perfect match for a small warrior figurine that we collected. Overall, though, small molded figurines are only a small subset (<2%) of the figurine assemblage at Ejutla, mostly anthropomorphic (Figure 7.33, see also Figure 7.17) but also representing dogs and felines (bottom row). A unique animal figurine befitting the prevalence of turtle in the faunal assemblage was molded into a hollow turtle shell (top left).

The most notable characteristic of the most common female figurines at Ejutla (Table 7.9, female #1 in Appendix 4) is the lack of decoration beyond a beaded necklace. The female wears a plain triangular tunic, or quechquémitl, over a long garment; the tunic is edged by an undecorated border, and the garment often has a basal band at the bottom; the bands may vary in width but do not have any decoration (Figure 7.34, Figure 7.35). In most cases, the arms are down at the sides of the figure, although a few have extended arms. A less common variation of this figure has two bands defining the edge of the tunic and two basal bands on the garment, and in another variation, the tunic is not triangular but has a rounded or angular bottom (Figure 7.36). The arms are often extended on these females, but a subset have their arms on their chest under a plain cape-like garment. When a necklace is present, it usually consists of a single strand of beads, although a few have double strands. A smaller set of female figurines have a decorated band on the tunic (Figure 7.37).

We found fewer corresponding heads relative to bodies, although the most complete and detailed mold that we found, in pit kiln 4, was a complete head with a double-strand braid (see Figure 7.16). A number of the heads we collected are similar to the mold, but none was a perfect match (Figure 7.38). In general, there is more variation in the headdresses than in the garments, with some having extra embellishments in the braid (Figure 7.39). We did not recover enough molded flat-back figurines that retained at least part of the head with the torso to tie specific headdresses to specific garments. And a high proportion of the figurine heads are broken facial fragments (Figure 7.40).

Figure 7.33. Small molded figurines, both anthropomorphic (top and center) and various animals (bottom), including a turtle shell (top left).

Figure 7.34. The most common female figurine variant at Ejutla, female #1 wearing a plain banded garment and triangular quechquémitl.

Figure 7.35. Other plainly dressed variants of female figurine #1.

The most common warrior at Ejutla wears only a loincloth, often with a simple necklace or neck ornament (see Table 7.9, third male variant in Appendix 4); the arms are generally down at the side of the figure, although in some variants the arms are raised or crossed on the chest. Most often the loincloth is plain (Figure 7.41), but some warriors wear a decorated loincloth and a more elaborate neck ornament (Figure 7.42). A smaller subset of warriors wear short garments above loincloths, both of which are decorated, and they typically have flexed arms and hold a shield and/or staff (Figure 7.43); the shields are often decorated. Another figurine variety that is more common at Ejutla than the other sites we excavated is an individual wearing a pleated skirt and holding an orb in his hands that is resting on the abdomen (Figure 7.44, fifth male variant in Appendix 4). These figurines are similar to a skirt-wearing male portrayed in select ceramic effigy vessels from the Late Classic period in the Valley of Oaxaca that has been associated with the supernatural Xipe Totec (Scott 1993; Sellen 2003). Generally small numbers of male figurines that also appear to be priests are present at the other sites, yet they tend to be different in kind, as they wear long capes (see Figure A4.8a–b).

Although less common than warriors with loincloths, some warrior figurines at Ejutla also wear cotton armor, often holding shields and staffs (Figure 7.45, see Table 7.9, first male variant in Appendix 4). Warriors wearing cotton armor are found much more widely across the Valley of Oaxaca than are warriors wearing loincloths like those at Ejutla (see Table A4.1). Only in Miahuatlán to the south are loincloths also more common (Brockington 1973, 36, 41; Markman 1981, 155). The lower frequency of figurine warriors with cotton armor is curious, as cotton could have

Figure 7.36. Variants of female figurine #1 wearing a double-banded garment and quechquémitl (top left), rounded quechquémitl (top right and second row), double strand necklace (rows 3 and 4), and with arms crossed or resting on chest (bottom row).

Figure 7.37. Variants of female figurine #1 wearing a decorated garment and quechquémitl.

been grown and seemingly was spun proportionately more frequently at these sites in the southern sector of the valley, certainly compared to sites in the drier eastern arm.

Like the torsos, the warrior heads at Ejutla show more variability than the female heads (Table 7.9, see warrior headgear in Appendix 4). Most wear a helmet, which may be plain, braided, or decorated (Figure 7.46). Also common are helmets with large medallions above the forehead or headgear that looks like a court jester (Figure 7.47). Other warriors have hooded or feathered headdresses, often with a tuft of feathers or other extension on top (Figure 7.48). The headgear on many warriors at Ejutla, especially feathered headdresses, is commonly represented on warriors at other sites in the valley. In contrast, the medallion and court jester helmets, like the warriors wearing only loincloths, are not. It is possible that these heads and torsos are from the same figurines, but there are no complete warriors in the figurine assemblage to support this supposition.

Other classes of figurines that are prevalent in Tlacolula, such as females wearing highly decorated garments and elaborate headdresses (female #2, Figure A4.5), smaller females with arms crossed on their chests (female #3, Figure A4.6), warriors in feathered capes (Figure A4.7e–g), and small modeled dogs (Figure A4.1) are present in very low quantities at Ejutla (see Table A4.1). Only at Lambityeco are large whistles the most dominant variety (Figure A4.10), although we collected dozens of fragments at Ejutla. These other figurines may not have been made by the Ejutla potters, but that cannot be ruled out given the presence of several wasters for some of these figurine varieties (see Table 7.9).

7.8. Ceramic Production: Synthesizing Lines of Evidence

In sum, we have presented multiple lines of evidence that the occupants of the excavated house made pottery and distributed their vessels through networks that were mostly local. Based on abundance, compositional analyses, tools of manufacture, defective products of various kinds, and the firing features themselves, we have marshaled evidence for specialized ceramic production. And all of that evidence comes from artifacts and features found

Figure 7.38. Figurine heads wearing braided headdresses.

adjacent to (and sometimes intermixed with) a domestic structure and the activities associated with it.

The Ejutla potters produced a range of utilitarian vessels including comals (tortilla griddles) and sahumadors (incense burners), ceramic objects such as spindle whorls for use in other economic activities (spinning), and ceramic mold-made figurines for communal and domestic rituals. The utilitarian ceramic vessels were made mostly for immediate household (or barrio) use, at the same time that the Ejutla artisans made figurines both for themselves and neighboring households and also for exchange to other communities in the area. The most common figurine varieties made at Ejutla (female #1 wearing a plain banded garment, see Figure 7.34, and the third male variant wearing only a loincloth, see Figure 7.41) are rare at sites in the Tlacolula arm of the valley (see Table A4.1), but they are not rare in the Ejutla Valley, where we recorded nearly identical forms during the regional survey (see Figure 7.21). One of the figurines from a site approximately 10 km from Ejutla is a compositional match to similar figurines from our excavations (Carpenter and Feinman 1999; Feinman 1999), as noted in section 7.1. Similar simply dressed females and warriors in loincloths are also more common in the Miahuatlán Valley to the south (Brockington 1973, 36, 41; Markman 1981, plate 13). Whether or not

Figure 7.39. Other braided headdress variants.

they were made in Ejutla, they circulated in a different interaction network in the southern part of the Central Valleys of Oaxaca. The spherical spindle whorls that are common at Ejutla are rare at El Palmillo, Lambityeco, and the Mitla Fortress in the eastern arm of the valley. Yet we found them at other sites near Ejutla during the regional survey. Along with molded figurines, they were made for exchange beyond the immediate household or barrio, at least to other communities in the Ejutla Valley.

But collectively, the Ejutla household was not devoted to ceramic production full-time, as shell working (discussed in chapter 8) and lapidary crafts (discussed in chapter 9) are also associated with the excavated structure. Following a pattern noted at other sites in peripheral parts of the Valley of Oaxaca (Kowalewski 2003, 73), ceramic production at Ejutla was less standardized on one paste as compared to more central parts of the valley, where gris pottery was more abundant compared to the plain café pottery at Ejutla (see Table 7.7). The use of pit kilns at Ejutla, with their ephemeral roofs that did not provide as much control as updraft kilns, is likely one factor, but there also may have been less competition or fewer market options than at the regional core (Feinman and Nicholas 2001b, 141–42).

We do not have broad-scale distribution studies for the Valley of Oaxaca like those for the Aztecs that show the exchange of goods from diverse locations in markets (e.g.,

Figure 7.40. Miscellaneous figurine heads and facial fragments.

Nichols et al. 2002). But in a trace element analysis of Classic period pottery, Leah Minc and colleagues (2015) documented the movement of pottery, mostly utilitarian, in the Valley of Oaxaca. For example, as noted in section 7.2, a relatively high proportion of utilitarian pottery at El Palmillo (~18%) was produced at sites farther to the west in the central part of the Tlacolula Valley (closer to Lambityeco). We also noted that the nicer, molded spindle whorls at high-status residences at El Palmillo are similar to those at Lambityeco (where there was ceramic production, though not in the contexts we excavated). Those whorls could have been made elsewhere at El Palmillo beyond the areas we excavated, but they also could have been made in Lambityeco and then traded to El Palmillo. In general pottery tended to move from west (where there are many more good clay sources) to east in the Valley of Oaxaca. Even today, in the Valley of Oaxaca, most of the pottery production that still occurs is carried out in communities to the west (Santa María Atzompa, San Bartolo Coyotepec). Pottery from these communities is exchanged through markets and middlemen and consumed by domestic units in the eastern part of the valley. Although materials from our excavations at the Ejutla site were not included in that study (Minc et al. 2015), pottery made from raw clay sources sampled from the southern valley/Ejutla zone was traded north to Jalieza, closer to the center of the Valley of Oaxaca. It may be that the Ejutla artisans made ceramic items for exchange not only to other sites in the Ejutla Valley but also to areas somewhat farther north. As we discuss in chapter 8 (shell production) and chapter 9 (tools of production), sourced obsidian from Ejutla and other sites in Oaxaca provides additional support for the broad-scale

Figure 7.41. Warriors wearing plain loincloths.

movement and exchange of goods from producers to consumers in Classic period Oaxaca. The twentieth- and twenty-first-century importance of domestic production and markets for the people of the Valley of Oaxaca likely has deep historical roots (Feinman and Nicholas 2010, 2012, 2021; Kowalewski 2012).

Figure 7.42. Warriors wearing decorated loincloths.

Figure 7.43. Warriors wearing decorated garments.

Figure 7.44. Priests wearing skirted garments, often holding a circular object on their abdomen, and priest wearing cape (bottom right).

Figure 7.45. Warriors wearing cotton armor.

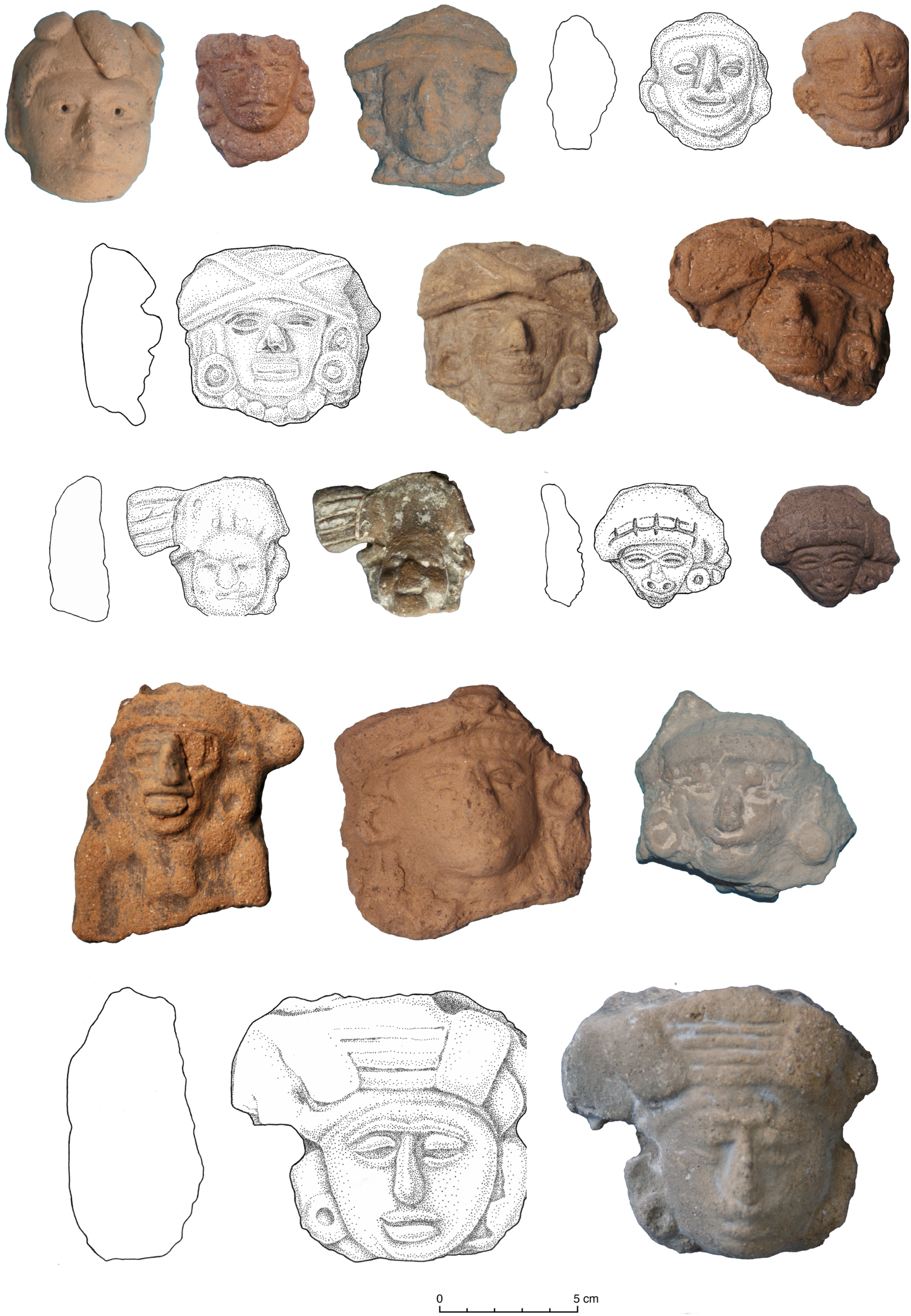

Figure 7.46. Warriors wearing a variety of helmets.

Figure 7.47. Warriors wearing headgear with medallions and baubles.

Figure 7.48. Warriors wearing hoods and feathered headdresses.

8

Shell Ornament Production and Routes of Exchange

Marine shell was highly valued in prehispanic Mesoamerica and was fashioned into a variety of ornaments with great symbolic importance. Shells were traded widely and were often deposited in high-status contexts (e.g., Borhegyi 1966; Coe 1959; Feinman 2001; Inomata and Emery 2014; Kidder 1947; Kolb 1987; Miller 1986; Moholy-Nagy 1985, 1994a, 1994b, 2008; Velázquez Castro and Melgar Tísoc 2021). One of those special contexts is Monte Albán's spectacular Tomb 7 in the landlocked Valley of Oaxaca (Caso 1932, 1969). The tomb is famous for its Late Postclassic assemblage of gold and jade objects, yet among the more than 500 exotic ornaments in the tomb were necklaces made of hundreds of shell beads, especially red ones crafted from the spiny oyster (*Spondylus*). Other necklaces made of small whole shells were used to adorn breast pieces of jaguar skin. There were ornamental shell bracelets, earspools, small mother of pearl plaques (primarily *Pinctada mazatlanica*) that were used in mosaics, and perforated shells that served as eyes in mosaics of turquoise. A conch-shell trumpet was one of the offerings left above the crypt after a reopening of the tomb (Marcus 1983b), which was originally constructed late in the Classic period.

Earlier during the Classic period, when the South Platform on Monte Albán's Main Plaza was dedicated, stone boxes with almost identical offerings were placed beneath at least three of the building's corners; each box contained a necklace of 7 jade beads, but the principal components were marine shells—5 large and 5 small spiny oysters (*Spondylus*) and 10 tent olive (*Oliva*) shells (Acosta 1958–59, 27). At Teotihuacan, in Central Mexico, Pacific Coast *Spondylus* shells were frequently deposited in caches and offerings (Kolb 1987, 90–91; Séjourné 1966, lámina 47), including Classic period offerings of spiny oysters and jade beads similar to those on the South Platform at Monte Albán (Marcus 1983c, 2009a, 97). Finished shell objects reported from other excavated contexts in the Valley of Oaxaca were also found principally in dedicatory offerings and funerary contexts (e.g., Bernal 1953; Bernal and Gamio 1974; Flannery 1983c; Gallegos Ruiz 1978; Paddock 1955). At El Palmillo, a child buried on a lower terrace was interred with an artificial, ceramic snail shell (Feinman and Nicholas 2009). These finds attest to the symbolic importance that the prehispanic inhabitants of the Valley of Oaxaca, and Mesoamerica more generally, gave to shell. *Spondylus* was especially valued; unworked shells have been found in dedicatory contexts not only in Oaxaca and Central Mexico but also across Mesoamerica (e.g., Coe 1959; Moholy-Nagy 1994a, 1994b; Turner 2022, 270). In addition to being a valued commodity, at Spanish contact, shell was one of several media that was, at certain times and places, used as currency in Mesoamerica and elsewhere in the Americas (Boekelman 1935; Gamble 2020; Paris 2021; Tozzer 1941). *Spondylus* was especially valued as a currency among the Maya (Freidel et al. 2016, 18). Shell and other materials appear to have taken on monetary functions in marketplace exchanges, at least among the Maya, as early as the Classic period (Baron 2018; Freidel et al. 2002, 2016; Paris 2021, 11).

Marine shell has generally and traditionally been recovered by Mesoamerican archaeologists as whole pieces or finished ornaments from special contexts. In a large-scale study, Lourdes Suárez Díez (1977, 1981) analyzed more than 20,000 shell objects recovered from salvage excavations of burials at 19 sites along the Balsas River in Guerrero and developed a detailed typology of prehispanic shell objects, including preferred species, and the techniques used in their manufacture. These are important volumes on prehispanic shell from Mesoamerica, but the shells in the analysis were found in dispersed funerary contexts and none were from a clear production context. At the time we began our study in Ejutla, relatively little was known about the range of prehispanic Mesoamerican marine shell ornaments that were produced, the species used to make specific ornaments, or the scale and context of the production activities. Who were the artisans, where did they work, what range of items did they make, and who were the intended consumers of their products?

Marine shell was imported and worked into ornaments in the Valley of Oaxaca as early as the Early Formative period (Flannery and Marcus 2005, 78–81; Flannery and Winter 1976; Pires-Ferreira 1975, 1976; Winter 1972). In the 1970s, Kent Flannery and Joyce Marcus documented shell working at San José Mogote, one of six Formative period villages that were excavated as part of Flannery's Prehistory and Human Ecology of the Valley of Oaxaca research program. San José Mogote was only one of two villages (the other is Tierras Largas) where extensively excavated houses contained areas of 1–2 m^2 littered with flint chips, chert knives and drills, fragments of cut and discarded shell, and shell ornament fragments that were broken in the process of manufacture, in addition to complete ornaments (Flannery and Winter 1976, 39). Shell working was most evident in two houses at San José Mogote (see Flannery and Marcus 2005, 184–95, 314–34). Only intact shell ornaments were recovered from the other Formative villages (Pires-Ferreira 1976, 315). Most of the shell was from the Pacific Coast, but a significant minority was imported from Atlantic drainage, freshwater riverine contexts. Pacific Coast pearl oyster (*Pinctada mazatlanica*) and spiny oyster (*Spondylus*) were the most frequently worked species (Flannery and Marcus 2005, 78; Pires-Ferreira 1978). The most common shell ornaments were shell pendants, both perforated whole shells and thin pieces carved into a variety of forms, and flat disk beads.

Shell-working contexts are rare elsewhere in the Valley of Oaxaca, both during the Formative period and in later times. In the 1960s and 1970s (Brockington 1973, 15; Markman 1981, 32), possible shell working was observed at Miahuatlán near the southern edge of the Central Valleys of Oaxaca. And during the survey of Monte Albán, several areas of possible shell working were noted on the surface of two site subdivisions (or sectors) near the Main Plaza where a relatively high proportion of terraces had evidence of craft production (Blanton 1978, 83). Although *Pinctada* and *Spondylus* also were important for ornamentation at Monte Albán, there was a relatively greater abundance of various bead forms and mosaics at the hilltop center than at San José Mogote. But no intensive studies of shell-working areas at Monte Albán or Miahuatlán have been completed, which has limited our understanding of how the context and nature of shell ornament manufacture and exchange in the Classic (and Postclassic) periods may have differed from the earlier Formative. Was later shell working carried out in domestic contexts, as at San José Mogote? In the Maya area, for example at the Classic period sites of Aguateca and Tikal, in Guatemala, elite households engaged in shell ornament production (Emery and Aoyama 2007; Inomata and Emery 2014, 156; Moholy-Nagy 1994a, 1994b, 104). Our discovery and excavation of a prehispanic shell-working area in a residential context at Ejutla provided a production context for the Valley of Oaxaca, which has allowed us the opportunity to start to address these questions.

In this chapter, we present the material evidence of shell working at Ejutla, which corresponds to key criteria laid out by Suárez Díez (1986, 121): presence of raw material (complete shells, fragments, tiny debris), tools used to work the shell, and both unfinished and finished ornaments. We present the nature of the assemblage and the shell taxa that were crafted into ornaments, the ornaments that were made, including preferred species, and the technology and tools that were used to work the shell. Microdebitage and soil chemistry analyses provided additional empirical support that helps tie shell working to the excavated house.

At the time that we were researching at Ejutla, we were invited by the principal investigators to analyze thousands of pieces of shell from a series of excavations at Monte Albán. These projects were directed over a number of field seasons by Marcus Winter and by Ernesto González Licón under the auspices of the Instituto Nacional de Antropología e Historia (Feinman and Nicholas 1995a, 1995b; González Licón 2003; Winter 1994; Winter et al. 1995). Most of the shell came from nonproduction contexts, where ornaments were more prevalent, but one area on the west side of the North Platform stood out for its high proportion of worked shell and lower number of finished ornaments. We end this discussion of shell with a broad comparison of the full shell assemblages at Ejutla and Monte Albán and a more focused comparison of the two shell-working areas. We later also received permission to source obsidian from the same projects at Monte Albán. We end this chapter with a comparison of the obsidian and shell assemblages together, in conjunction with spatial modeling of travel routes (White and Barber 2012) and more recent sourcing of mica at Monte Albán and Teotihuacan (Manzanilla et al. 2017), as they collectively provide an additional vantage on exchange and how these nonlocal goods arrived in Ejutla and beyond.

8.1. The Ejutla Shell Assemblage

We recovered more than 25,000 pieces (~34 kg) of broken and worked shell during our investigations in the eastern sector of the Ejutla site, 77% of which came from a dense midden within a few meters of the north side of the excavated house (Table 8.1). Levels of both 5 and 10 cm in many of the units (2 × 2 m) in the midden contained hundreds of pieces of shell debris mixed with cut fragments and unfinished ornaments (Figure 8.1). Shell was also recovered in the house, with lower amounts in smaller midden deposits immediately surrounding the house, in fill below the house, and in the pit kilns. Approximately 5% was recovered from the surface of fields south of the house, where we suspect there were other households in a neighborhood of craftworkers, including those who worked marine shell into ornaments.

The largest component of the shell assemblage (61.1%) is broken shell and other small debris without clear evidence of working (Figure 8.2, Figure 8.3). Although no complete shells of large, unworked marine species were recovered, a wide range of shell body parts (see Morris 1966, 261–65) were present in the debris, including gastropod spires (>400) and columellas (>3400), bivalve hinges (>2300),

Table 8.1. The shell assemblage at Ejutla by class.

Shell category	Bivalve	Gastropod	Unidentified	Total
broken shell	6666	6337	2319	15322
worked shell	7315	1021	263	8599
whole shell (unmodified)	19	50	1	70
unfinished ornament	593	221	73	887
finished ornament	108	68	18	194
Total	14701	7697	2674	25072

Figure 8.1. All cut marine shell debris collected from level 3 in 16n26e (top) and level 3 in 16n24e (bottom).

and large wall (>1200) and margin (>400) fragments from both bivalves and gastropods (Appendix 5a). Large gastropods and nacreous mother of pearl almost evenly dominated the broken shell assemblage (Figure 8.4a). Since no parts of the well-represented shell species are systematically missing from our collections (Figure 8.5), we suspect that most of the shell was transported to Ejutla as whole (or nearly whole) shells rather than as finished pieces and blanks and that primary breakage and working of the shell occurred on site. Some of the pieces of broken shell are large enough to be raw material for future use. But the lack of large whole shells or even many large pieces of broken shell in our collections would seem to indicate that the Ejutla craftworkers made judicious use of this exotic raw material in manufacturing ornaments for exchange.

Approximately one-third (34.3%) of the assemblage consists of shell fragments with clear evidence of modification or working (Appendix 5b, Figure 8.6). Most prevalent are pieces of shell with one (>2600) or two or more smooth cut edges (>3500), unwanted pieces of shell cut away with a stone tool during the crafting of an ornament. Additional pieces of debris have one (>200) or two edges (>100) that had been cut with a perishable material, most likely string or cord, while others were cut more roughly. The edge of string-cut pieces tend to have a smooth even edge compared to the rougher surfaces cut with stone tools. Some shell fragments have abraded surfaces (>400) but lack other evidence of working. These pieces were all cut away from a shell during the process of creating ornaments or are the byproducts of bead or bracelet manufacture (Suárez 1981, lámina 36). Still others bear surficial cut marks (>100) (Figure 8.7). Another indicator of shell working is the presence of production failures, including roughed-out blanks (>1000) that were never finished, ornaments that failed early in the process, and beads with misdrilled perforations (Figure 8.8). In contrast to the unworked shell, the cut shell

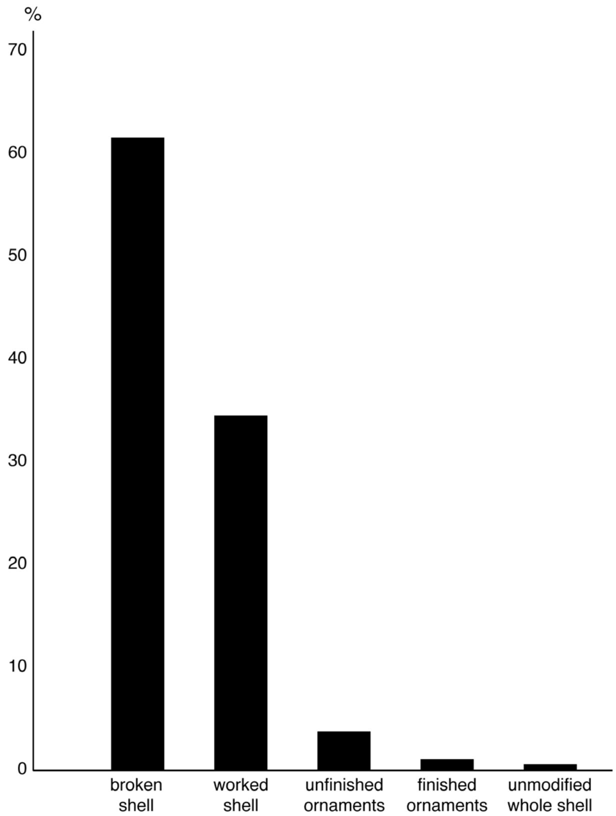

Figure 8.2. Percentage of broad shell categories in the Ejutla assemblage.

debris is heavily dominated by nacreous mother of pearl (see Figure 8.4b), and an additional 4.3 kg of nacreous chipping debris and tiny flakes that were too small to be counted were weighed by context instead.

Ornaments and blanks (pieces formed as intermediate stages in the process of bead or pendant manufacture, Figure 8.9) are less abundant, only 4.6% of the shell assemblage. They include small angular plaques (*placas*), disks, beads, pendants, bracelets, and unperforated but whole small marine shells. Most of the ornaments are unfinished; less than 1% of the recovered shell are finished ornaments. Based on the very low proportion of finished ornaments compared to the volume of shell debris from the excavations, it seems highly improbable that all ornaments crafted in Ejutla were consumed by the residents of the excavated house or even locally. Few finished ornaments were found in the house (<20), and there was only one tiny bead in the subfloor tomb (see Figure 5.6).

Published quantitative data for comparison are few, but for Tikal, Moholy-Nagy (1985, 148–150, 1994a, 1994b) reported a much larger proportion (35–45%) of finished and largely finished artifacts in the shell assemblage. At Aguateca (Guatemala), ornaments account for more than 60% of reported nonfood shell (Inomata and Emery 2014, 141–42). At Ceibal in Guatemala (Sharpe 2019), the Classic period shell assemblage is heavily dominated by ornaments (87%), most from burials. We found similar

Figure 8.3. Small broken pieces of shell with no evidence of working.

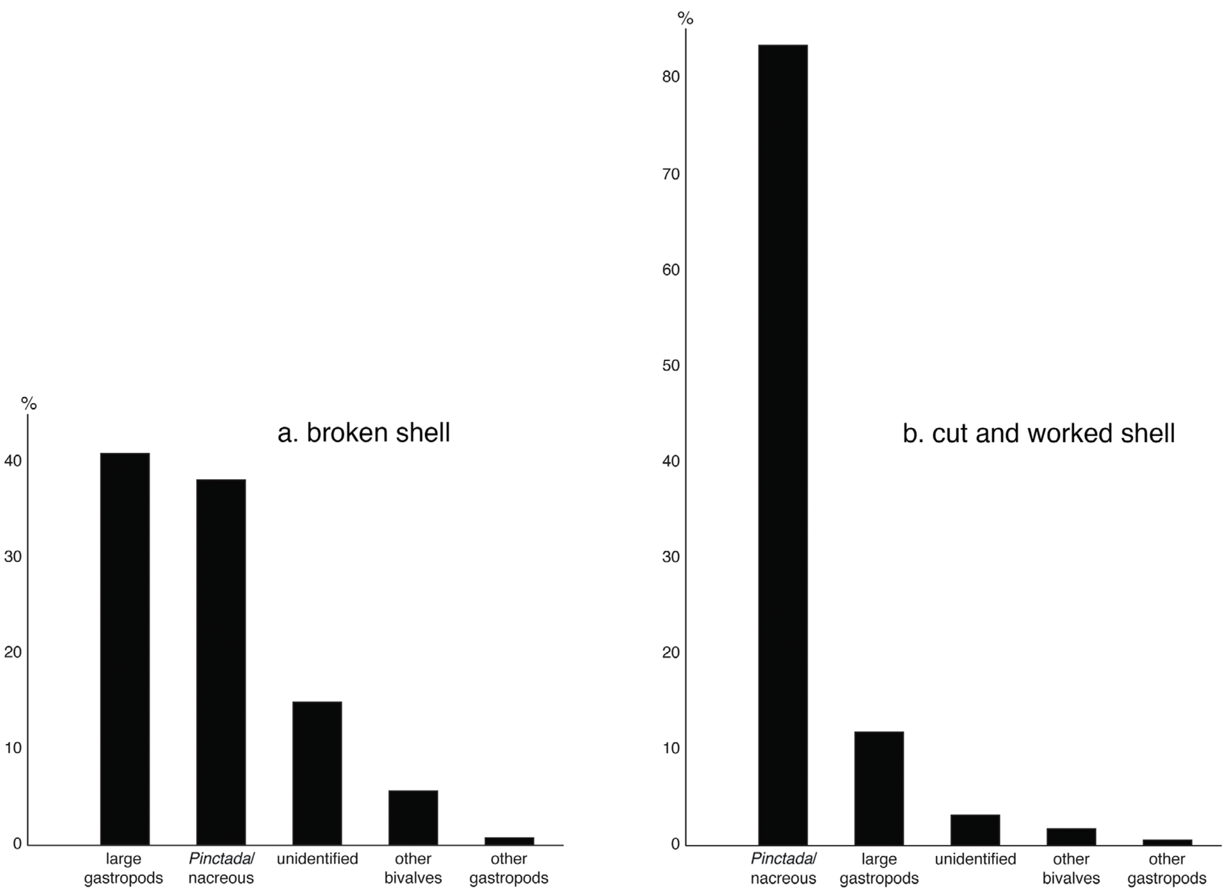

Figure 8.4. Graphs of (a) broken shell and (b) worked shell by major shell category.

Figure 8.5. Large broken and cut pieces of shell include *Strombus* columellas (top left), spires (top right), and margins (bottom left), and *Pinctada* margins and hinges (bottom right).

Figure 8.6. Cut and worked pieces from large gastropods.

Figure 8.7. Shell fragments with surficial cut marks.

Figure 8.8. Ornament failures include broken beads (top) and unfinished shell placas (bottom).

patterns in the marine shell we analyzed at Monte Albán, where ornaments comprise at least 40% of all analyzed shell in most contexts. However, in one context (discussed in section 8.6) the patterns are more similar to Ejutla in that only 11% of the shell are finished or unfinished ornaments and 45% are worked debris/discarded fragments. At El Palmillo, Lambityeco, and the Mitla Fortress in Tlacolula, ornaments account for 60–80%. Other analyzed contexts in highland Mesoamerica include the Xalla complex at Teotihuacan (Velázquez Castro et al. 2019), where finished and unfinished ornaments are 30% of the shell assemblage**.**

8.2. Shell Species at Ejutla

Shell varieties recovered in the Ejutla investigations are almost entirely native to the Pacific Coast (Keen 1971; Morris 1966; Olsson 1961), 100 km away across high mountains. The few Atlantic species (Morris 1973) that were identified in the Ejutla assemblage (*Cypraea cinerea* and *Marginella apicina*) are represented by only a few specimens (<0.03%). In all, we identified more than 90 different taxa from 25 bivalve and 37 gastropod genera (Table 8.2); however, only 7 genera account for more than 98% of the identifiable shell (Table 8.3). Four

Figure 8.9. Shell ornament blanks for beads and pendants.

Table 8.2. Shell species at Ejutla.

Bivalves		
Genus	**Species**	**Common name**
Anadara	*cepoides*	ark shell
Anadara	*esmeralda*	ark shell
Anadara	*formosa*	ark shell
Anadara	*grandis* ?	ark shell
Anadara	*multicostata*	ark shell
Anomia	*adamas* (?)	jingle shell
Arca	*pacifica*	ark shell
Barbatia	*alternata*	ark shell
Chama	*buddiana*	jewel box
Chama	*echinata* (*C. coralloides*)	jewel box
Chama	*frondosa* (?)	jewel box
Chione	sp.	Venus clam
Codakia	sp.	lucine
Donax	sp.	bean clam
Glycymeris	*bicolor* (?)	bitterweet shell
Glycymeris	*gigantea*	bitterweet shell
Glycymeris	*maculata* (?)	bitterweet shell
Glycymeris	*multicostata* (?)	bitterweet shell
Heterodonax	*bimaculata* (?)	false donax
Lucina	*approximata*	lucine
Lucina	*mazatlanica*	lucine
Ostrea	*angelica*	oyster
Ostrea	*corteziensis*	oyster
Ostrea	*fisheri*	fisher's oyster
Ostrea	*iridescens*	oyster
Pecten	*vogdesi* (?)	scallop
Periglypta	*multicostata*	Venus clam
Pinctada	*mazatlanica*	pearly oyster
Pitar	sp.	Venus clam
Protothaca	sp.	Venus clam
Pteria	*sterna* (?)	winged oyster
Semele	sp.	semele
Solamen (*Megacrenella*)	*columbianum* (?)	mussel
Spondylus	*calcifer* (*S. limbatus*)	spiny oyster
Spondylus	*princeps* (*S. crassisquama*)	spiny oyster
Tellina	*virgo* (?)	tellin
Tivela	*planulata*	Venus clam
Trachycardium	*consors*	cockle shell
Trachycardium	*pristipleura*	cockle shell
Trachycardium	*senticosum*	cockle shell

Bivalves		
Genus	**Species**	**Common name**
Acmaea	*discors*	small limpet
Acmaea	*fascicularis*	small limpet
Acmaea	*limatula*	small limpet
Acmaea	*mitella* (?)	small limpet
Acmaea	*pediculus*	small limpet
Acmaea	*pelta*	small limpet
Agaronia	*testacea*	olive shell
Astraea	*olivacea*	olive turban
Astraea	*unguis*	turban
Calliostoma	*leanum* (?)	pearly top shell
Cancellaria	*urceolata*	nutmeg
Cassis	*centiquadrata*	helmet
Cerithidea	*albonodosa*	horn shell
Cerithidea	*mazatlanica*	horn shell
Cerithidea	*valida* (?)	horn shell
Cerithium	sp.	horn shell
Conus	sp.	cone shell
Cypraea	*arabicula*	cowrie
Cypraea	*cinerea*	cowrie
Ficus	*ventricosa*	fig shell
Fissurella	*gemmata*	keyhole limpet
Fissurella	*rubropicta*	keyhole limpet
Fissurella	*volcano* (?)	keyhole limpet
Haliotis	*fulgens*	green abalone
Haliotis	*rufrescens*	red abalone
Janthina	*globosa*	violet snail
Jenneria	*pustulata*	sea button
Lamellaria	*inflata*	wide-mouth snail
Littorina	*conspersa*	periwinkle
Malea	*ringens*	cask shell
Marginella	*apicina* (?)	marginella
Mitra (?)	sp.	miter
Mitrella	*lalage* (?)	dove shell
Morum	*tuberculosum*	helmet
Nassarius	*bailyi*	dog whelk
Natica	*elenae*	moon shell
Oliva	*porphyria*	olive shell
Olivella	*alba* (?)	olive shell
Olivella	*semistriata* (?)	olive shell
Olivella	*tergina*	olive shell
Patella	*mexicana* (*Ancistromesus mexicanus*)	giant limpet
Persicula	*frumentum*	marginella
Petaloconchus (?)	sp.	worm shell
Polinices	sp.	moon shell
Purpura	*columellaris* (?)	dye shell
Pyrene	*major*	dove shell

Bivalves		
Genus	**Species**	**Common name**
Strombus	*galeatus*	conch shell
Strombus	*gracilior*	conch shell
Strombus	*peruvianus*	conch shell
Tegula	*mariana* (?)	pearly top shell
Thais	*speciosa*	dogwinkle
Thais	*triangularis*	dogwinkle
Trivia	*sanguinea*	sea button
Turritella	*leucostoma*	turret

Table 8.3. Quantity of each shell genus identified at Ejutla.

Class	Genus	Quantity
Bivalve	*Anadara*	89
Bivalve	*Anomia*	1
Bivalve	*Arca*	3
Bivalve	*Barbatia*	1
Bivalve	*Chama*	394
Bivalve	*Chione*	2
Bivalve	*Codakia*	1
Bivalve	*Donax*	1
Bivalve	*Dosinia*	1
Bivalve	*Glycymeris*	9
Bivalve	*Heterodonax*	1
Bivalve	*Lucina*	3
Bivalve	*Ostrea*	14
Bivalve	*Pecten*	3
Bivalve	*Periglypta*	2
Bivalve	*Pinctada*/nacreous	13638
Bivalve	*Pitar*	4
Bivalve	*Protothaca*	1
Bivalve	*Pteria*	1
Bivalve	*Semele*	1
Bivalve	*Solamen* (*Megacrenella*)	1
Bivalve	*Spondylus*	182
Bivalve	*Tellina*	2
Bivalve	*Tivela*	1
Bivalve	*Trachycardium*	8
Gastropod	*Acmaea*	45
Gastropod	*Agaronia*	4
Gastropod	*Astraea*	8
Gastropod	*Callistoma*	1
Gastropod	*Cancellaria*	2
Gastropod	*Cassis*	11
Gastropod	*Cerithidea*	11
Gastropod	*Cerithium*	1
Gastropod	*Conus*	2

(*Continued*)

Class	Genus	Quantity
Gastropod	*Cypraea*	5
Gastropod	*Ficus*	33
Gastropod	*Fissurella*	5
Gastropod	*Haliotis*	15
Gastropod	*Janthina*	1
Gastropod	*Jenneria*	4
Gastropod	*Lamellaria*	1
Gastropod	*Littorina*	2
Gastropod	*Malea*	6
Gastropod	*Marginella*	5
Gastropod	*Mitra* (?)	1
Gastropod	*Mitrella*	1
Gastropod	*Morum*	1
Gastropod	*Nassarius*	1
Gastropod	*Natica*	2
Gastropod	*Oliva*	36
Gastropod	*Olivella*	7
Gastropod	*Patella*	443
Gastropod	*Persicula*	1
Gastropod	*Petaloconchus* (?)	7
Gastropod	*Polinices*	1
Gastropod	*Purpura*	1
Gastropod	*Pyrene*	1
Gastropod	*Strombus*	207
Gastropod	*Tegula*	1
Gastropod	*Thais*	13
Gastropod	*Trivia*	3
Gastropod	*Turritella*	2

of these genera are bivalves (pelecypods): nacreous pearl oysters (*Pinctada*), jewel boxes (*Chama*), spiny oysters (*Spondylus*), and ark shells (*Anadara*); three are snails (gastropods): giant limpets (*Patella*), conch shells (*Strombus*), and small limpets (*Acmaea*). All are marine bivalves and gastropods that were frequently cut and shaped to make ornaments in prehispanic highland Mesoamerica (and generally were not used for food) (e.g., Kolb 1987; Pires-Ferreira 1978; Starbuck 1975; Suárez 1981). Most of these species are relatively easy to procure along the Pacific Coast of Oaxaca; for example, *Strombus* and *Pinctada* are found in shallow water and the intertidal zone (Keen 1971), but *Spondylus* could be significantly more difficult to procure from depths up to 30 m (García-Domínguez et al. 2021, 17).

Pinctada mazatlanica (mother of pearl) is by far the most abundant species at Ejutla (Figure 8.10, see also Figure 8.5). Its large size and shiny nacreous interior made it a prized raw material for ornamentation. Although unmistakable features are removed from many fragments and the most finished nacreous ornaments, their assignment to *Pinctada* is based on the thickness of the shell pieces and the almost complete absence of other nacreous shells identified to genus (15 fragments total of *Ostrea* sp. and *Pteria* sp. and none of the freshwater mussel, *Margaritifera* sp.). The breaking and working of the thousands of *Pinctada* shells we identified in the collections would have resulted in large quantities of mother of pearl ornaments and prodigious amounts of nacreous debris. In all, *Pinctada* comprises 61% of all shell at Ejutla by weight (~16.4 kg), and minute pieces of chipping debris (not included in shell totals) are 25% of that weight. More than half of the ornaments, especially small placas, disks (and disk beads), and bracelets, were made from *Pinctada*.

Chama and *Spondylus* were prized for their red and purple colorations. Though less abundant than *Pinctada*, *Chama* sp., especially *C. echinata* (spiny jewel box), and *Spondylus* sp. (spiny oyster), both *S. princeps* and *S. calcifer*, are common at Ejutla (Figure 8.11, Figure 8.12, see also ornament blanks in Figure 8.9). Dozens of ornaments were crafted from each genus, most often small beads and pendants. The nomenclature of these three species was revised in the late 2000s to *Spondylus crassisquama* (syn: *S. princeps*), *S. limbatus* (syn: *S. calcifer*), and *Chama coralloides* (syn: *C. echinata*) (García-Domínguez et al. 2021; Lodeiros et al. 2016). Keen (1971) was our principal source to speciate *Chama* and *Spondylus* shells during our analyses in the 1990s, and we retain those designations here. Although ark shells are among the more common genera (~90 or more specimens), we recovered only one unfinished whole shell ornament of *Anadara* sp. Other identified genera of bivalves are represented by 10 or fewer specimens each (Figure 8.13, see Table 8.3).

Of the 37 gastropod genera identified at Ejutla, only the two large ones mentioned above are represented in any substantial quantities. Most ornaments of *Patella mexicana* (giant limpet, syn: *Ancistromesus mexicanus*) are bracelet fragments (Figure 8.14). Although smaller matte white beads and blanks cannot be identified to species, many are from unidentified gastropods, including several large beads identified as likely *Strombus* sp., especially *S. galeatus* (conch shell) (see Figure 8.9 top left). Most of the other identified taxa are small gastropods that are present in low quantities, including olive shells (*Agaronia*, *Oliva*, *Olivella*), nutmegs (*Cancellaria*), horn shells (*Cerithidea*), cowries (*Cypraea*), small limpets (*Acmaea*), keyhole limpets (*Fissurella*), sea buttons (*Jenneria*), periwinkles (*Littorina*), marginellas (*Marginella*), nerites (*Nerita*), dye shells (*Thais*), and turret shells (*Turritella*) (Figure 8.15). These shells generally are whole (or almost whole), and many had been perforated for stringing.

8.3. Shell Ornaments

Based on the amount of production debris and the high proportion of unfinished ornaments in the shell assemblage, the Ejutla craftworkers made the full range of ornaments that we recovered on site, most frequently small

Figure 8.10. Broken and worked fragments of *Pinctada mazatlanica*.

placas, disks, and beads, but also pendants and bracelets (Table 8.4, Appendix 6). Most of the ornaments are cut and shaped pieces in which the original form of the shell has been obliterated or small gastropods perforated for stringing; engraving or other decoration on finished shell ornaments was rare. As the artisans crafted the ornaments, they generally had a clear preference for certain taxa (Figure 8.16), and even for which taxa to use to create different kinds of ornaments (see Table 8.4). The tailoring of specific materials to particular end products reflects intentionality and planning at levels that traditionally would not have been expected in a domestic context but do match expectations for practiced artisans crafting goods for exchange beyond their own household or local community.

The most abundant shell ornaments are small angular placas of nacreous pearl oyster that have been cut and

Figure 8.11. ***Chama*** **shells; three shells on right are interior (top) and exterior (bottom).**

Figure 8.12. ***Spondylus*** **shells; three shells on bottom are interior (left) and exterior (right).**

Figure 8.13. Other bivalve species, *Anadara* (top) and *Glycymeris* (bottom).

Figure 8.14. Unfinished ornaments and fragments of *Patella mexicana*.

abraded on all sides. Approximately 92% were cut from large *Pinctada* shells, mostly as triangles and rectangles but also in a variety of other shapes including trapezoids, squares, diamonds, crescents, and pentagons (Table 8.5; Figure 8.17). One unusual placa is in the form of the number 7. Although the size of the placas varies from small 5.0 × 6.0 × 0.5 mm squares to large rectangles that are 36.4 × 16.4 × 5.2 mm, most of the nacreous placas are between 10 and 25 mm long and 1–4 mm thick. We considered fewer than 20% of the placas to be finished (i.e., all four edges had been abraded smooth), but, depending on their size, some may have been blanks intended to be

Figure 8.15. Small gastropods, including horn shells, marginellas, olive shells, and turret shells (top two rows), sea buttons and cowrie shells (middle two rows), and small limpets (center right and bottom two rows).

tabular beads or pendants that had not yet been perforated. Other finished nacreous pieces could have been crafted for mosaic inlays (Caso 1965, 906; Ekholm 1942, 111; Kidder 1947, 65; Lowe and Agrinier 1960, 42; Suárez 1981, 39), sewn on cloth (Kidder 1947, 65; Mahler 1965, 584; Mester 1985), or used as incrustations in the teeth of ceramic figurines and urns (see Romero 1958).

The remaining placas (8%) were cut from the walls of large gastropods or unidentified shell, and are generally smaller than the nacreous placas. Some are small rectangles and trapezoids, but two-thirds are small, low triangles, mostly 10–20 mm at the base and 7.3–11.5 mm tall (Figure 8.18). The small triangles are more standardized than most other placas, apparently cut to a template (Figure 8.18 bottom). Their intended use is not clear. Several larger ornamental pieces of *Spondylus* that we coded as blanks likely are unfinished placas (see Figures 8.9 and 8.12), similar in form to those reported from El Perú-Waka in Guatemala (Navarro-Farr et al. 2021, figure 7e) and Mayapan (Pollock et al. 1962, figure 43b–d) and what have been called spangles at Tikal (Moholy-Nagy 2008, figure 148a) and elsewhere (Kidder et al. 1946, 151, figure 461a–d), all of which were perforated and may have been sewn together (Coe 1959, 59, figure 54; Moholy-Nagy 2008, 58; Navarro-Farr et al. 2021, 196), as in a reconstructed garment at Tula (Velázquez Castro et al. 2021, figures 8 and 15).

Thin circular shell disks are the second most abundant ornaments. Like the placas, most (77%) of the disks were crafted from nacreous pieces of *Pinctada*. Except for two

Table 8.4. Shell ornaments by genus at Ejutla.

Genus	Bead	Bracelet	Disk	Pectoral	Pendant	Placa	Unknown	Unmodified whole shell	Total
Bivalves	**42**	**16**	**214**	**–**	**48**	**372**	**8**	**19**	**719**
Anadara	–	–	–	–	–	–	–	1	1
Anomia	–	–	–	–	1	–	–	–	1
Chama	14	–	1	–	4	–	–	4	23
Chione	–	–	–	–	–	–	–	1	1
Glycymeris	–	–	–	–	–	–	–	6	6
Heterodonax	–	–	–	–	–	–	–	1	1
Lucina	–	–	–	–	–	–	–	3	3
nacreous/*Pinctada*	21	3	123	–	10	198	2	–	357
Ostrea	–	–	–	–	–	–	–	1	1
pelecypod UID	1	2	–	–	2	–	–	1	6
Pinctada	–	11	89	–	8	173	1	–	282
Solamen	–	–	–	–	–	–	–	1	1
Spondylus	6	–	1	–	23	1	5	–	36
Gastropods	**114**	**11**	**48**	**1**	**50**	**24**	**44**	**50**	**342**
Acmaea	–	–	–	–	1	–	–	8	9
Agaronia	–	–	–	–	1	–	–	–	1
Astraea	–	–	–	–	–	–	–	1	1
Cerithidea	–	–	–	–	1	–	–	9	10
Cerithium	–	–	–	–	–	–	–	1	1
Cypraea	–	–	–	–	–	–	–	2	2
Ficus	–	–	–	–	1	1	2	–	4
gastropod UID	63	1	40	–	29	17	29	2	181
Haliotis	–	–	–	–	–	2		–	2
Janthina	–	–	–	–	–	–	–	1	1
Jenneria	–	–	–	–	2	–	–	1	3
Lamellaria	–	–	–	–	–	–	–	1	1
limpet UID	–	–	–	–	–	–	–	3	3
Littorina	–	–	–	–	–	–	–	2	2
Marginella	2	–	–	–	–	–	–	3	5
matte white UID	36	1	8	–	9	3	7	–	64
Mitra(?)	–	–	–	–	–	–	–	1	1
Mitrella	–	–	–	–	–	–	–	1	1
Nassarius	–	–	–	–	–	–	–	1	1
Natica	–	–	–	–	–	–	–	1	1
Oliva	1	–	–	–	4	–	–	–	5
Olivella	–	–	–	–	1	–	–	4	5
Patella	–	9	–	1		–	2	–	12
Pyrene	–	–	–	–	–	–	–	1	1
Strombus	4	–	–	–	1	1	4	–	10
Tegula	–	–	–	–	–	–	–	1	1
Thais	8	–	–	–	–	–	–	3	11
Trivia	–	–	–	–	–	–	–	2	2
Turritella	–	–	–	–	–	–	–	1	1
UID	53	1	13		14	7	1	1	90
Total	209	28	275	1	112	403	53	70	1151

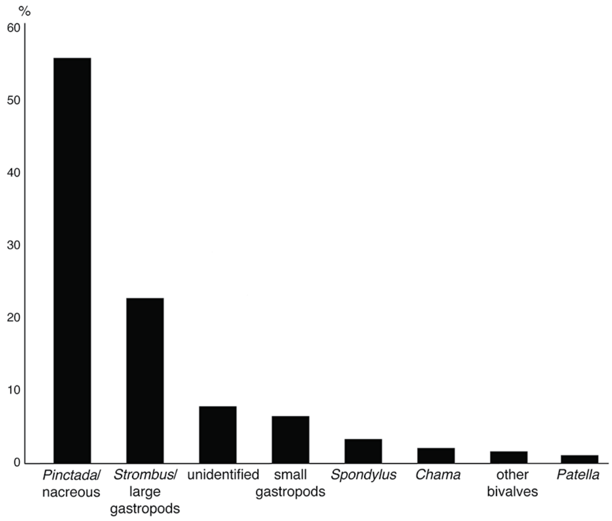

Figure 8.16. Graph of principal genera used to make shell ornaments (includes finished and unfinished ornaments).

colorful ones cut from *Chama* and *Spondylus* shells, the rest are matte white cut from unidentified gastropods. The disks are unperforated and largely unfinished. Most (84%) of the disks have abraded or roughly cut/chipped edges, while a smaller subset of disks (16%) are perfectly circular, cut with a hollow tubular drill (see section 8.4 on shell-working techniques). The two methods were used on both bivalves and gastropods, but to craft different kinds of disks. The abraded disks of *Pinctada* are generally larger and thinner than those made from gastropods (Figure 8.19, Figure 8.20). The *Pinctada* disks have an average diameter of 15.6 mm (most fall between 10 and 20 mm) and are 2.7 mm thick (ranging between 1 and 5 mm), similar to the dimensions of the placas; they may have been intended to be finished into thin beads and pendants or mosaic pieces, or sewn on clothing. The gastropod disks average 9.9 mm in diameter (most are 8–12 mm) and are 3.7 mm thick (most between 2 and 6 mm); these smaller matte white disks appear to be beads in the making that were discarded prior to final smoothing and perforation.

The drill-cut disks of all shell types are more regular in size, between 10 and 13 mm in diameter (average 11.5 mm for *Pinctada* and 11.4 mm for gastropods) (Figure 8.21). As with the abraded disks, the gastropod drill-cut disks tend to be thicker than nacreous ones (3.3 mm vs. 2.4 mm). Some of these disks have been further processed by abrading the outer edge completely smooth. These disks may have been intended to be beads, although the *Pinctada* ones also could have been used in ways similar to the nacreous placas once they were finished.

Table 8.5. Types of shell ornaments at Ejutla by class.

Ornament category	Bivalves	Gastropods	UID	Total
Bead	**42**	**114**	**53**	**209**
cubical	–	12	2	14
cylindrical	5	25	11	41
disk bead	28	18	12	58
flat square	–	8	2	10
irregular	2	8	13	23
miniature	5	3	6	14
spherical	–	15	4	19
tubular	2	14	2	18
whole shell bead	–	10	–	10
unknown	–	1	1	2
Bracelet	**16**	**11**	**1**	**28**
Disk	**214**	**48**	**13**	**275**
abraded disk	175	35	11	221
circular disk (with lip)	32	10	2	44
circular disk (no lip)	6	2	–	8
unknown	1	1	–	2
Pectoral	**–**	**1**	**–**	**1**
Pendant	**48**	**50**	**14**	**112**
circular	7	–	1	8
comb shape	–	–	1	1
cubical	–	2	–	2
diamond	–	2	–	2
flower	–	1	–	1
hourglass	–	–	1	1

Ornament category	Bivalves	Gastropods	UID	Total
incisor shape	1	–	–	1
lunate	–	1	–	1
monkey face	–	1	–	1
oval	2	1	2	5
tabular irregular	10	4	2	16
tabular needle	–	1	–	1
tabular rectangular	18	16	3	37
tabular trapezoid	1	6	2	9
tabular triangular	3	2	–	5
teardrop	2	5	1	8
whole shell	3	8	–	11
unknown	1	–	1	2
Placa	**372**	**24**	**7**	**403**
circular	5	–	–	5
crescent	2	–	1	3
diamond	10	–	–	10
irregular	34	–	2	36
lunate	10	–	–	10
number 7	1	–	–	1
pentagonal	8	–	–	8
rectangular	105	4	–	109
spade-like	1	–	–	1
square	29	–	–	29
stepped edges	–	1	–	1
teardrop	2	–	–	2
trapezoid	28	2	–	30
triangular	131	17	3	151
unknown	6	–	1	7
Unknown ornament	**8**	**44**	**1**	**53**
circular	–	1	–	1
cubical	4	12	–	16
lunate	–	2	–	2
star shape	1	–	–	1
tabular diamond	–	1	–	1
tabular hexagon	1	–	–	1
tabular irregular	1	5	–	6
tabular rectangular	–	15	–	15
tabular triangular	–	4	–	4
tubular	–	1	–	1
unclear	1	3	1	5
Unmodifed whole shell	**19**	**50**	**1**	**70**
Total	**719**	**342**	**90**	**1151**

The Ejutla artisans also made a variety of beads and pendants. Both are perforated for stringing, either grouped into a necklace or as single adornments. We consider ornaments with one central perforation to be beads, while ornaments with one or more perforations near one end of the ornament are pendants (Moholy-Nagy 2008, 40, 47; Suárez 1977, 23, 30). Not surprisingly, there is greater size and form variation in the pendants, while beads in general are smaller than most pendants.

In her analysis of shell from Tikal, Hattula Moholy-Nagy (1989, 141) drew a distinction between 'natural' and

Figure 8.17. Finished (top) and unfinished (bottom) *Pinctada* placas.

'formed' beads (see also Yerkes 1993, 238). The original form of the shell is still identifiable in natural beads, while it has been obliterated in formed beads. Formed beads require considerably more time and skill than natural ones, which only require a drilled or tapped-out hole for suspension (Moholy-Nagy 1994b, 96–97; Suárez 1981, lámina 3b). Most of the shell beads in Ejutla generally fit Moholy-Nagy's second category and include disk, cylindrical, spherical, square, and tubular beads (see Table 8.5; see also Kidder 1947, 62–63; Suárez 1977, 92–98). In contrast to the placas and disks, which were primarily crafted from bivalves, most of the formed beads in Ejutla were made from unidentified shell and gastropods, only a few of which could be identified to genus, all *Strombus*. Approximately 20% were made from bivalves, primarily *Chama*, *Spondyus*, and nacreous shell, most likely *Pinctada*. Gastropods were also used to make a wider range of bead forms than bivalves were. Beads in Ejutla lacked surface carving.

Disk beads with a central perforation are the most abundant form of bead in Ejutla (as they are elsewhere in Mesoamerica—e.g., Kidder 1947, 61; Willey 1972, 223), at least in part due to the nature of shell, which is more conducive to making disks than making larger, thicker beads (Garber 1989, 64). Although this form was made almost equally from gastropods and bivalves, all beads of *Pinctada* are disk beads (Figure 8.22). Like the unperforated shell disks, most of the disk beads have abraded edges, but a small number of the nacreous beads were cut with a tubular drill, with edges then abraded smooth. The drill-cut disk beads have the same diameter

Figure 8.18. Placas, mostly triangular, cut from gastropods. Top left set of shells shows the interior side of the shell (above) and the cut made on the exterior side of the shell (below). In the lower set of shells, the form and size of a finished triangular placa fits a cut triangular piece on a large gastropod.

Figure 8.19. Abraded *Pinctada* disks.

Figure 8.20. Abraded gastropod disks.

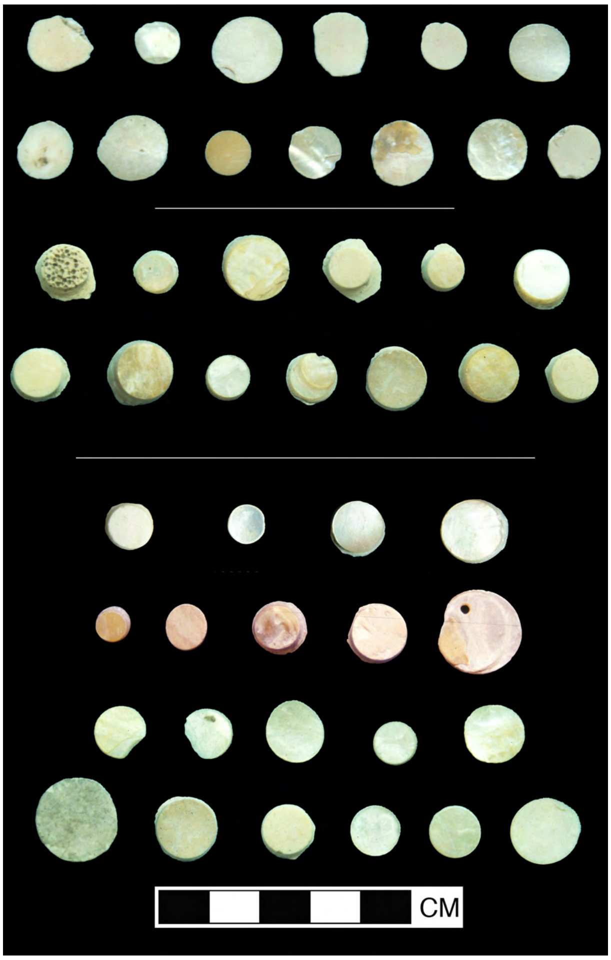

Figure 8.21. Shell disks cut with a hollow tubular drill. The top two sets of discs are the same objects, showing the interior side of the shell (top) and the exterior side cut side (center).

Figure 8.22. Shell disk beads.

as the unperforated disks, but in general are thinner; some are barely 0.1 mm thick. The abraded disk beads also tend to be thinner and smaller than many of the unperforated abraded disks, so not all of the abraded disks may have been intended to be finished into beads. Approximately two-thirds of the disk beads have biconical perforations (63%), while in more than a third the perforations are conical (37%).

The other bead forms—small cylindrical, spherical, square or cubical, miniature, and tubular—were made mostly from gastropods, although a dozen were crafted from *Chama* and *Spondylus* (Figure 8.23, Figure 8.24). The cylindrical beads are typically 4.5–9.0 mm in diameter and 2–5 mm thick, with flattened ends. Spherical beads are rounder (generally 4.5–8.0 mm thick) and a bit larger (mostly 5–9 mm in diameter), but some are as large as 18 mm in diameter. Square and cubical beads range from ~6.5 × 7 × 2.5 mm to as large as 16 × 17 × 8 mm, although most are ~9–11 mm square and 3.5–5 mm tall. Miniature beads have diameters of ~5 mm or smaller and are only 2–2.5 mm thick. Tubular beads generally have diameters of 4–5 mm and range between 7.5 and 30 mm tall; taller unfinished ones may have been intended to be cut into several shorter cylindrical beads. Compared to the disk beads, these other bead forms were primarily perforated biconically. Overall, the Ejutla artisans made more cylindrical beads than other forms. Many unfinished beads had been partially or completely perforated but had not undergone final abrading and smoothing.

A small subset of beads are natural beads, all made from small gastropods, mostly small dogwinkles (*Thais triangularis)*, all with irregular perforations, but also a few marginellas (*Marginella apicina)* (Figure 8.25). Several unperforated *T. triangularis* and *M. apicina* shells in the shell assemblage may have been intended to be perforated and used as beads.

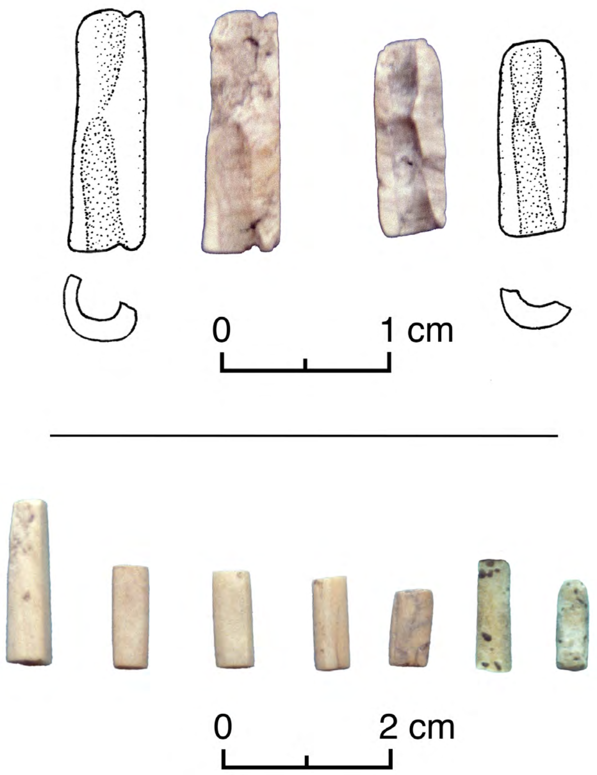

Figure 8.24. Tubular shell beads; the two beads at top are drawn at 200% to show the biconical perforations; they are the two beads on the right in the row of beads at bottom.

The pendants are more variable than beads in form and size and, in contrast to beads, were more evenly crafted from gastropods and large bivalves. Like beads, pendants can also be formed or natural (Moholy-Nagy 1994b, 96). The

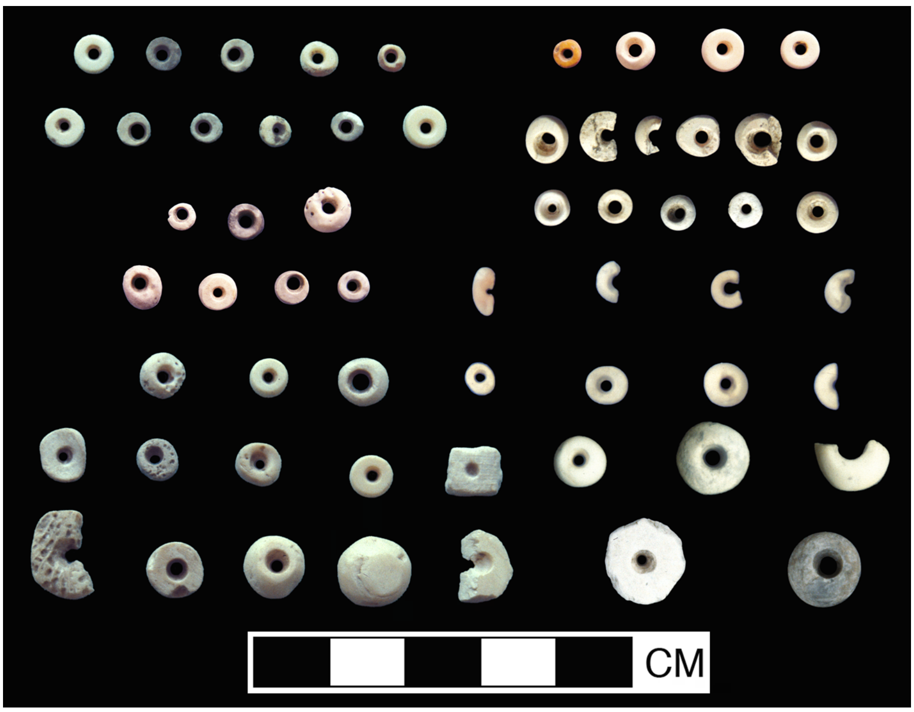

Figure 8.23. Small shell beads at Ejutla are mostly cylindrical or spherical; several in bottom two rows are unfinished.

Figure 8.25. Whole shell beads and pendants; top left are the dorsal (above) and ventral (below) sides of perforated *Thais* shells.

Ejutla craftworkers created more formed (90%) pendants than natural, approximately half of which were too processed to identify the taxa at all or to classify beyond unknown gastropod (Figure 8.26). The most frequently identified taxa are spiny oyster (*Spondylus princeps* and *S. calcifer*) (see also Moholy-Nagy 1989, 141) and nacreous mother of pearl (*Pinctada mazatlanica*). The pendants were made into a variety of tabular forms including circles, ovals, rectangles, triangles, squares, and trapezoids, but rectangular pendants are most common. The more finished formed pendants range from ~10 to 30 mm in length, although several unperforated pendant blanks are as long as 40–70 mm. Some of the larger abraded shell disks may be unfinished pendants that were never perforated. Perforations for stringing the ornaments are both conical and biconical, with pendants ~2.5 mm thick or less primarily perforated from one side (conical) and those thicker than 2.5 mm perforated biconically.

Most whole shell pendants are small gastropods (8), including *Jenneria pustulata*, *Oliva porphyria*, *Olivella* sp., *Agaronia testacea*, *Cerithidea albonodosa*, and *Acmaea* sp. (see Figure 8.25). Most *O. porphyria* shells were perforated with cord and abrasive, and as is typical for ornaments made from *Oliva* shells (Suárez 1977, 33–34), the spires had been cut away. The other gastropods have irregular perforations. But several small bivalves also are largely whole; several *Chama* pendants were less processed so that more of the original shape of the shell was retained, and one small jingle shell (*Anomia* sp.) was perforated and turned into a pendant with no additional processing. The *Chama* pendants have conical perforations, while the *Anomia* shell has an irregular perforation. An additional 70 small whole shells are unmodified but include most of the species that were used to make whole shell pendants (and beads). Additional whole shell bivalves represented by more than one specimen include *Glycymeris* and *Lucina*. Unmodified whole shell gastropods include *Cypraea*, *Littorina*, *Olivella*, and *Trivia sanguinea* (see Figure 8.15). We suspect that these shells were curated as raw material that had not yet been perforated for stringing.

Only two ornaments in the Ejutla shell assemblage, both pendants, have carved designs on the surface of the shell (Figure 8.27). One is a small head cut from the wall of a large gastropod with what appears to be the face of a monkey in profile. The ornament broke across a conical perforation in the neck. Although representations vary, monkey profiles have been carved onto bracelets (Spinden 1911, 37–38) and (from our perspective) other ornaments (Coe 1959, figure 51a). The other carved ornament was cut from the spire of a small olive shell (Olividae). The very tip of the spire was cut off and abraded smooth, and four notches were carved into the edge of the spire. The top volutions of the spire had been carved to accentuate the

Figure 8.26. Formed shell pendants.

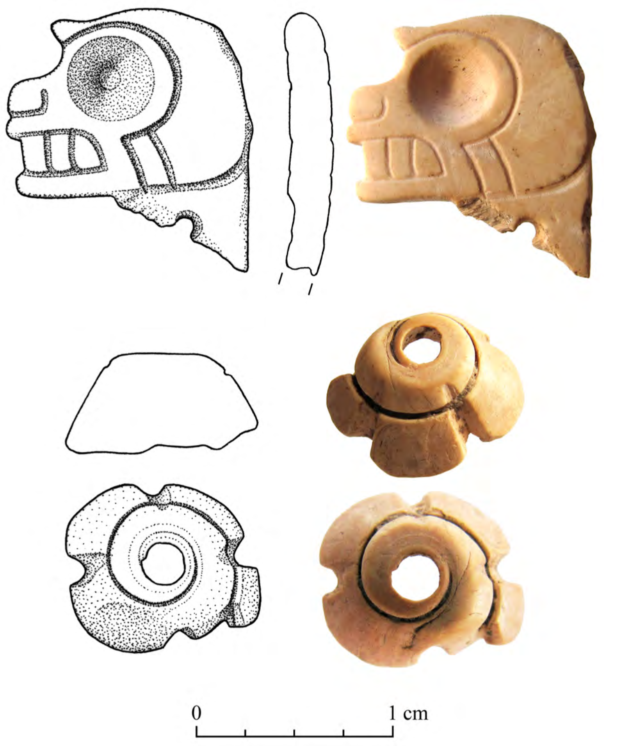

Figure 8.27. Two carved shell ornaments, a monkey pendant and a representation of a flower.

spiral, and the finished ornament reminds us of a flower, or rosette. These two finished ornaments were found on the house floor. Because they are the only two carved shell ornaments in the Ejutla shell assemblage, we suspect that these finely carved ornaments were largely crafted for exchange.

The Ejutla craftworkers also made bracelets, almost entirely from *Patella americana* and *Pinctada mazatlanica* (Figure 8.28). All of the bracelets are very partial, so we do not know how large they were, but the width of the recovered bracelet fragments have a bimodal distribution, so two different kinds of bracelets were made. Most of the *Patella* bracelets are smaller, between 5 and 7.5 mm wide; only a few are between 10 and 13 mm wide. *Pinctada* bracelets are evenly divided between two size modes, smaller ones 4–6.5 mm wide, and larger ones 10.5–23 mm wide.

By far the largest ornament is a *Patella mexicana* pectoral measuring 182 × 152 mm, in which the top of the shell has been cut out (Figure 8.29). The remaining margin of the shell is ~15–20 mm wide. The exterior margin and the cut edge were abraded smooth, but there is no other decoration on the ornament. The ornament is a perfect match (in form and size) to what were called 'horse collar' ornaments at Kaminaljuyu (Kidder et al. 1946, 149, figure 162e, h) and is

Figure 8.28. Bracelets of *Patella* (top and third row left) and *Pinctada* (other five in center two rows and bottom).

very similar to a large oval-shaped pectoral ornament from Tula that was made from a large marine limpet (Carter and Lukach 2023, figure 7). Horse collar ornaments are also reported from Tikal (Moholy-Nagy 2008, 46, figure 181a) and Uaxactun (Kidder 1947, 63, figure 52); similar ornaments made from large *Patella* shells have also been called *brazaletes* (Suárez 1977, 47, láminas 48 and 49).

8.4. Shell-Working Techniques and Tools

A range of techniques and materials were used prehispanically to work shell into ornaments (Suárez 1977, 1981; see also Emery and Aoyama 2007; Melgar Tísoc et al. 2010; Moholy-Nagy 2008, 6; Velázquez Castro et al. 2019). We begin with a general discussion of shell-working practices in Mesoamerica before turning to the techniques and tools evidenced in the Ejutla shell assemblage. An initial step is percussion (Suárez 1981, 11–12), the striking of the shell with a hard object in which the body of the shell changes form to separate the various parts of the shell, such as the spire of gastropods (Suárez 1981, lámina 3a); this action breaks the shell into irregular pieces, some of which could be worked into ornaments and many others that are waste and discarded. The hard object may be stone, antler, or another shell. Large hammerstones were often used for the initial fragmentation of the shells (e.g., Kozuch 2022; Mayo and Cooke 2005, 294, figures 11 and 12). The percussion can also be indirect, using an intermediary tool, such as a chisel or wedge, between the striking tool and the shell (Suárez 1981, lámina 3b); this technique is effective in species with a laminar structure, such as mother of pearl, to obtain nacreous sheets of varying thickness, which are an excellent raw material for ornaments. Rough shaping of pieces can also be accomplished by pressure flaking with a harder rock or heat-hardened deer antler (Foreman 1978, 18, figure 3; Suárez 1981, 12).

Most processing of the shell into ornaments involves abrasion using a variety of tools and abrasive agents, such as fine sand or volcanic ash, and water (Suárez 1981, 12–13; see also Melgar Tísoc et al. 2018, 103). The edges of a broken piece of shell can be abraded against stones of varying coarseness to smooth them into a range of circular

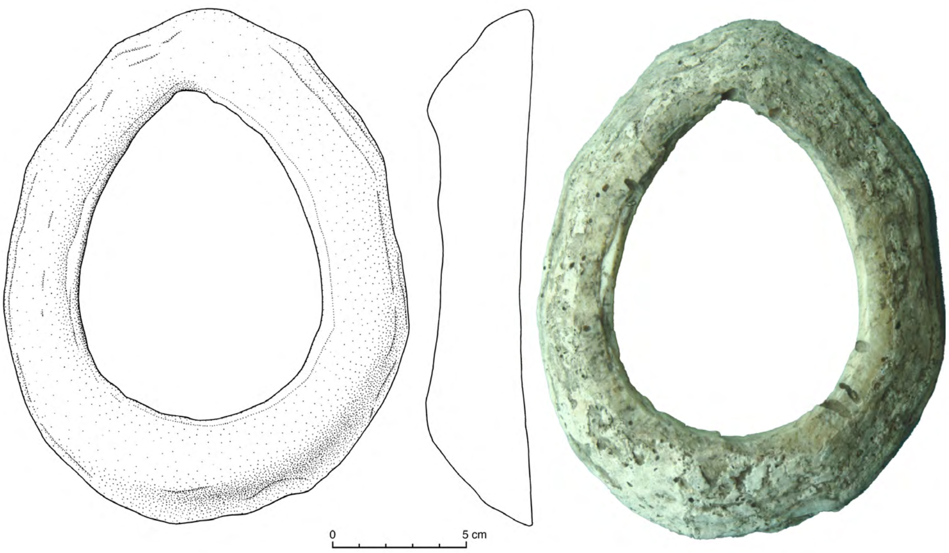

Figure 8.29. Pectoral cut from a large *Patella mexicana* shell.

and quadrangular forms (Melgar Tísoc et al. 2010, 2018; Suárez 1977, lámina 6b and c; 1981, lámina 55a)—even a smooth rock can be used for abrasion by covering it with a slurry of sand/dirt (Foreman 1978, 21), or the shell can be cut with materials of greater or lesser hardness by adding an abrasive to create friction as the tool is moved back and forth across the shell, and water for lubrication. For example, shells commonly used for ornaments, like *Spondylus princeps*, have a hardness around 3 on the Mohs scale, compared to 1 for talc, 7 for rock crystal, and 10 for diamonds (Foreman 1978, 18). The shell can be cut with thin, knifelike stone tools (Suárez 1981, lámina 4a), including obsidian blades and chert flakes (Emery and Aoyama 2007; Lewenstein 1987, 113; Martínez López and Markens 2004; Melgar Tísoc and Solís Ciriaco 2021; Melgar Tísoc et al. 2010, 2018; Velázquez Castro et al. 2019). Taut strips of perishable materials—vegetal, cordage, leather—can be used with abrasives at various stages of manufacture. These include cutting through the columella and body of gastropods or slicing off the top of large pelecypods (Moholy-Nagy 2008, 6; Suárez 1981, lámina 4b). Likewise, cord or string can serve to cut quadrangular pendants and mosaic pieces and in the near-final stages of cutting bead blanks into cylindrical beads (Suárez 1981, láminas 9 and 14). The vegetal material can also be used with water and abrasive to saw notches in a stone to hold a piece of shell for further processing (Foreman 1978, 18). Hollow tubular drills (Foshag 1957, 54–55; Holmes 1919, 350–51), most likely segments of cane (Caso 1965, 905; Kozuch 2022), can be used to extract small circular disks for crafting into thin disk beads and other ornamental pieces.

Various tools and methods were used to perforate shell ornaments, including small stone drills, hollow drills, pressure applied with a hard object, and indirect percussion (Suárez 1981, 13–15) (see chapter 9). Drills, whether solid or hollow, require abrasives and water, as the abrasive material is the chief agent (Rau 1869, 393; Suárez 1981, 13). Small solid stone drills, often of chert (Martínez López and Markens 2004; Melgar Tísoc et al. 2010, 2018; Yerkes 1983, 1989, 1993), were used to perforate formed beads and pendants, either before or after the ornament was otherwise finished (Suárez 1981, lámina 14). The perforation can be cut from one side (conical) or both sides (biconical) (Suárez 1981, lámina 5), depending, in part, on the kind of shell and the thickness of the ornament. Perforations on thicker beads, for example, are almost exclusively biconical, while the perforation of thinner beads and most pendants is more variable. Larger perforators could be handheld, while smaller microdrills were hafted to a cane stalk or wooden stick; with a bead blank placed on a secure anvil or in a notch carved into stone, the drill can be rotated using a bow drill or by rolling the drill shaft rapidly back and forth between the palms (Foreman 1978, 19, figures 6 and 7; Kozuch 2022; Yerkes 1993, 235, figure 4). String can be used to ream out perforations made with solid drills (Moholy-Nagy 2008, 6, figure 126c).

Some gastropod pendants, such as *Oliva* sp., were perforated near the base of the shell with a back and forth cutting motion (Suárez 1981, 14–15), using either a sharp stone tool or string and abrasive (see Figure 8.25). Even bone (and antler), also 3 on the Mohs scale, can be used to perforate shell; in experiments, it took approximately 35 minutes to perforate a 1.3 mm thick disk of clam shell using a handheld porcupine quill in conjunction with abrasives (Foreman 1978, 18). Pressure and indirect percussion were also used on small thin-walled gastropods to punch a hole for stringing, either as beads or as pendants (Suárez 1981, 35, láminas 3b and 24a). In contrast to the other methods, pressure and percussion produce irregular perforations. While carving on shell ornaments is not common, a pointed stone tool can be used for thicker carvings, and sharp objects like long thorns can be used for thinner, fine lines (Suárez 1981, láminas 6c and 28b).

Through a systematic examination of the shell assemblage and other artifactual debris at Ejutla, we documented the methods and tools that the Ejiutla artisans used for working shell into ornaments, although none of the perishable materials used to work shell—cane drills, cordage, and possibly thorns—were preserved. We found that the same tools and methods were used on a range of shell taxa, both bivalves and gastropods, but that the different properties of shell taxa were a factor in what kind of ornaments were made and how the shells were initially processed. For example, most of the shell ornaments at Ejutla were made from nacreous pearl oyster, primarily *Pinctada mazatlanica*, and from large gastropods that include *Strombus* sp. and *Patella mexicana*. In analyzing these two classes of shell, we noted that a much larger proportion of nacreous shell fragments have cut edges or other evidence of working (52% of nacreous shell) compared to large gastropods (only 12%), even though the number of ornaments that were made from each class of shell is comparable (4.7% of all nacreous shell and approximately 3.5% of large gastropods). In general, the most abundant non-nacreous bivalves (*Spondylus* and *Chama*) were processed into ornaments in ways more similar to the large gastropods. Most of the whole shell beads and pendants made from small gastropods generally were minimally processed beyond perforation. We begin with the methods and tools the Ejutla craftworkers used to craft ornaments from nacreous shell.

The laminar nacreous surface of pearl oysters easily flakes off into thin sheets, so striking a mother of pearl shell with a hard object can shatter it and produce many unworkable small pieces. Instead, the presence of *Pinctada* hinges with string-cut edges indicates the use of cordage with abrasive and water in the initial processing of pearl oysters to remove unwanted parts of the shell. Cordage and sharp stone tools were also employed to cut small tabular pieces from the wall of the shell that were then crafted into placas, the ornaments most often made from *Pinctada*. Many pieces of discarded nacreous shell and roughed-out blanks have at least one edge that was cut with string or have incomplete string cuts across the surface, and more than half (54%) of the placas, both finished and unfinished, have string-cut edges. Cutting shell with cordage often leaves a slight lip on the opposite edge, as the shell snaps just before the cut is completed. The lip on most of the tabular placas is on the interior, nacreous side of the shell, showing that the string cuts were usually initiated from the exterior. In many cases, part of the exterior surface, the periostracum, is still attached to the unfinished ornament. Some of the nicest finished placas appear to have been cut with string on one or more edges and then abraded smooth, removing remnants of the lip (see Figure 8.17). Final abrasion of the edges removes indications of the method of cutting, so it is not always possible to determine without finding pieces of debris with string-cut edges and marks.

Thousands of discarded nacreous fragments in the shell assemblage have one or two edges that were cut with a sharp stone tool; some of these cut edges were curved or slightly irregular and not as smooth as those cut with string. These characteristics are visible in many placas (~46%), which in addition to string-cut tabular forms also include crescents, circular forms, teardrops, and two singular forms, one shaped like a spade and another shaped like a thick number 7. Most of the nacreous pendants were crafted in the same manner. In close subsurface association with the shell debris, we found thousands of heavily worn obsidian blades (see Table 5.5). These spent blades would have been effectively dulled by repeatedly cutting and working the hard, abrasive shell (Lewenstein 1987; Parry 1987). Hundreds of chert blades, knives, and bifaces found in these same contexts may also have been used to cut the shell (e.g., Melgar Tísoc et al. 2010, 2018). There was no status distinction in the use of chert or obsidian tools (contra Melgar Tísoc et al. 2018), as the craftworkers of this middle-status household used both obsidian and chert tools to work shell into a range of ornaments, from simple shell disks and placas to the two carved shell pendants in the house.

The other common ornaments made from nacreous shells—small thin disks and disk beads—were crafted in two ways. Approximately 15% were cut with a hollow tubular drill, most likely cane, which is readily available along the banks of the Ejutla River and nearby tributaries. Like the placas cut with string, the shell was drilled from the exterior, with a slight lip often remaining on the interior, nacreous side of the disk (see Figure 8.21). The lip was abraded away on more finished disks and on disks that were perforated for stringing. The diameter of the drilled disks is fairly uniform, an average of 11 mm. A larger proportion of the shell disks (>80%) were formed by abrading small pieces of shell against another hard surface to create a smooth rounded edge. Many stone abraders of basalt and other materials found with the shell have visible striations as a result of abrading a hard material such as shell (see Figure 5.39). The abraded disks are more variable in size, less uniformly circular, and generally not as finely finished as the disks cut with a tubular drill.

In contrast to nacreous shell, a first step in processing large gastropods was striking them with a hard object, breaking them into numerous fragments with jagged edges, including body whorls, outer margins, spire fragments, and large columella pieces and bases (see Figure 8.5). Some of the spires were intact, broken just below the last suture of the spire. Hammerstones and river cobbles that are abundant at Ejutla would have been effective at breaking up large shells and creating large quantities of broken shell. Another abundant tool are large utilized basalt flakes and bifaces (see Figure 5.35), some heavily battered, that also may have been used to knock off the spires from large gastropods. While abundant at Ejutla, large basalt flakes are rare at the other Classic period sites—El Palmillo, the Mitla Fortress, and Lambityeco—where there is no excavated evidence of shell working. The fragments chosen for ornamentation could then be roughly shaped by simple flaking or chipping into disk-like forms that were then abraded and polished into finished ornaments (Foreman 1978, 18).

The Ejutla craftworkers also used perishable materials to cut pieces from large gastropods for making ornaments. String with abrasive and water was used to cut through columellas and the thick outer margins to obtain larger ornament blanks**.** String was also used to cut smaller fragments from the walls of the shell that were then crafted into small placas, mostly low triangles (see Figure 8.18). From shell remnants it is clear that the base of the triangle was cut first, and then the two sides. Although hollow tubular drills were used more often on nacreous shell, the craftworkers also used them to cut small flat disks from the wall of the large gastropods (see Figure 8.21). Most of these disks were not finished, still having a sharp lip on the bottom side. Given the smaller size of the unperforated gastropod disks (compared to most nacreous disks) and their shape and their lack of nacre, the unfinished disks appear to be an intermediate step in the production of beads rather than inlay like some of the nacreous disks.

Most of the formed beads at Ejutla were made from large gastropods. Thinner beads were made by abrading the edge of broken body fragments into roughly circular forms. Working fragments of large, non-nacreous bivalves (especially *Spondylus* and *Chama*) followed a similar path (e.g., Suárez 1981, lámina 14). Making larger cylindrical and spherical beads was more labor intensive than the production of whole shell beads or pendants (mostly small gastropods) or thin disk beads (more often crafted from nacreous shell) (e.g., Garber 1989; see also Kozuch 2022). For larger cylindrical and spherical beads, segments were cut from the columella or the thick outer margin, using either string or a sharp stone tool, such as an obsidian blade. The cut pieces were then shaped and smoothed into the desired shape through abrasion against a hard object, such as the river cobbles and ground stone slabs bearing linear marks from abrasion wear that we found in the midden and in association with the structure (see chapter 9). There also were hundreds of abraders and polishing or burnishing stones and pebbles, of basalt and quartz, especially, that could have been used to finish shaping and then polishing the ornaments.

Perforation can take place before or after a bead is abraded and polished into final form, and we found many finely smoothed beads that had yet to be perforated and rough unfinished beads with complete and partial perforations (see Figure 8.9). But in general, the larger and thicker beads tended to be perforated prior to final shaping and polishing, while the smaller and flatter beads were perforated at the end of the manufacturing process (see also Kozuch 2022). Most of the beads (and pendants) were perforated with small stone drills and perforators. During the excavations we recovered hundreds of solid chert microdrills (see Figure 5.34), but also a few of obsidian and quartz, which have been linked to the perforation of beads and pendants elsewhere in Oaxaca (Martínez López and Markens 2004, Parry 1987; see also Melgar Tísoc et al. 2010, 2018) and in other parts of the Americas (e.g., Mester 1985, 107; Yerkes 1989, 115). High quantities of tiny bifacial thinning flakes found in association with the shell and stone tools evidence frequent sharpening of the tools as they were used to perforate the shell ornaments. Other thin pendants, mostly *Pinctada*, have small smoothed drilled perforations that appear to have been cut with a narrow tubular drill (~5 mm). Half a dozen small flat stones with circular lines or pitting may have been drilling platforms (see chapter 9). Other evidence of shell working was recovered from the floor of the structure.

8.5. The Residence and Shell Working

The shell debris and the tools to work the shell were heavily concentrated in the dense midden just to the north of structure, likely deposited there from a nearby household (our excavated house) in the immediate vicinity (e.g., Bayham 1996; Beck 2003; Beck and Hill 2004; Blinman 1989). Overall quantities of artifacts were much lower in the house, which is not unexpected, since house and patio floors, worldwide, were often swept clean, removing or displacing macroartifacts (e.g., Hutson and Terry 2006; Kenoyer et al. 1991; Vidale et al. 1993). But small pieces of microdebitage are harder to remove, even if mats are placed in the work area to collect debris as it is produced (e.g., Clark 1989). Here we look at both to tie shell working (and the creation of the dense midden) to the residents of the excavated house.

Inside the limits of the house, we found a number of tools that have been tied to shell working, including 2 chert perforators (1 is a microdrill), half a dozen small obsidian perforators (1 is a microdrill), and over 100 heavily used obsidian blades. Although other tools, like hammerstones and abraders, were present in the house, they cannot be tied so closely to shell working alone, yet 1 abrader, several small cobbles, and several flat stones that appear to be work platforms have abrasion wear consistent with smoothing a hard material like shell. In addition, 2 small flat stones have circular drilling marks from repeated use as drilling platforms (see chapter 9).

The more than 18,000 pieces of shell in the midden dwarf the hundreds (~400) of pieces of shell on the house floor. Ornaments were also overwhelmingly recovered from the midden instead of other contexts, but not to the same degree, so that the proportion of ornaments, especially finished ones, was higher in the house than in the midden, which helps tie shell working and consumption of at least some shell ornaments to the house. Approximately 4.6% of the shell in the house are finished ornaments, compared to 0.7% in the midden. In addition, unperforated small whole shells were proportionally 10 times more common in the house than the midden (6 to 22) or other contexts; they may have been stored in the house prior to perforation into ornaments. Only in the house did finished ornaments outnumber unfinished ones (by 2 to 1). In all other excavated contexts, unfinished ornaments greatly outnumbered finished ones, especially in the midden, where they were five times more abundant.

Most of the ornaments in the house are beads, including 6 perforated *Thais* shells that were found together, likely part of a necklace (see Figure 8.25 top left). Out of the 20 finished ornaments in the house, only 2 are *Pinctada*, 1 pendant and 1 placa. This is a much lower proportion of *Pinctada* than in all the ornaments in the midden (77/130). Because nacreous debris in the house indicates that the residents of the house did make nacreous ornaments, it appears that they consumed many fewer of the nacreous ornaments they made compared to those made from large and small gastropods.

Chemical and microartifactual analyses also tie shell working to the house (Middleton 1998, 2004). Samples for microdebitage analysis were collected from all floor units, and control samples were selected from midden, fill, and off-site contexts. The heavy fraction of the samples was sorted by size, with a focus on the materials recovered with 1/16 in.–1 mm mesh (in the sand size range), as materials of this size interval are the most difficult to remove once they have fallen to the floor and are most likely to be in primary context (e.g., Miller Rosen 1989).

The microdebitage analysis produced distribution patterns that do not conform to that of the macroartifacts (Middleton 1998, 213–15), which were present in much higher quantities in the midden than in the house. In contrast, the control samples from the midden, fill, and off-site contexts yielded no 1 mm microdebitage (Middleton 1998, 213–15). The highest amounts of microdebitage were from floor levels, and then the exterior midden adjacent to the house. These samples contained micro flecks of shell and small chert flakes in the 1.0 mm range, some even smaller, the byproduct of tool use or maintenance (Fladmark 1982). In addition to the chert flakes and shell flecks, tiny flakes of obsidian, greenstone, mica, onyx, and basalt were recovered in these samples. By weight and quantity (per liter of soil), the density of these microartifacts generally exceeds the figures reported by Widmer (1991) for a suggested lapidary and shell-working area at Teotihuacan (Feinman et al. 1993). The recovery of these microartifacts in the heavy fraction from floor deposits provides additional support for the argument that these materials were worked inside the excavated house (Feinman et al. 1993; Middleton 1998, 213–14). Although larger artifacts of most of these materials were not particularly abundant in the collections associated specifically with the structure, all were present in the dense midden. For comparison, similar samples taken from a deposit associated with ceramic firing contained many small fired concretions and a greater quantity of small bone fragments than found within the house, but only a single obsidian flake and no shell (Feinman et al. 1993, 38–39).

Chemical analysis (ICP) of soil samples taken systematically from the house floor also supports shell working in the house (Middleton 1998, 238–40; 2004; Middleton and Price 1996). Marine shell is composed of calcium carbonate, which is subject to chemical degradation and dissolution in the soil. Some techniques used in shell working produce very fine debris that cannot be recovered by standard microdebitage techniques, so chemical residues help pinpoint shell working. Bone also degrades into the soil, contributing both calcium and phosphorus, but the Ca:P ratio can help separate calcium added by shell and calcium added by bone. The ratio is highest where Ca is high relative to P (more shell) and lowest where P is highest relative to Ca (more bone). At Ejutla, high concentrations of Ca and P in the midden are attributable to the presences of both shell and bone in those deposits. The highest Ca:P ratios were within the house, with the distribution matching the general pattern of marine shell microdebitage (Middleton 1998, 240). These two independent analyses provide additional evidence that the residents of the excavated structure engaged in crafting shell ornaments.

8.6. Monte Albán Shell and Comparisons with Ejutla

Between 1992 and 1997 we analyzed thousands of pieces of shell from excavations at Monte Albán directed by Marcus Winter and by Ernesto González Licón (Feinman and Nicholas 1995a, 1995b; Appendix 7). Most of the shell (n = 3351) is from contexts that were excavated during the Proyecto Especial Monte Albán 1992–94 (Winter 1994). These contexts are concentrated on the Main Plaza and the North Platform and include one area where there is good evidence of shell working (see also Martínez López and Markens 2004). A small amount (n = 82) is from burials and tombs that were excavated on several terraces in a residential area approximately 1 km northwest of the Main Plaza during the Proyecto Monte Albán 1972–73 (Winter et al. 1995). The rest of the analyzed pieces (n = 386) are from one context on the North Platform and from houses and mortuary contexts that were exposed during the Proyecto Salvamento Carretera de Acceso a Monte Albán 1991, directed by González Licón (2003).

There are many similarities between the shell assemblages at Monte Albán and Ejutla. The same broad categories of worked and unworked shell that we documented at Ejutla are present at Monte Albán (Table 8.6). At both sites, most of the shell is from the Pacific Ocean; a few *Marginella apicina* shells at both sites and one *Cypraea cinerea* at Ejutla are from the Atlantic**,** Table 8.7). This preponderance is not unexpected given that the shortest routes (by foot) from the Pacific Coast into the center of the valley and Monte Albán pass through Ejutla (White and Barber 2012). The most abundant taxon is *Pinctada mazatlanica*, accounting for 55–60% of all shell in the analyzed collections (Table 8.8, Figure 8.30), and nacreous mother of pearl also accounts for ~50–60% of all ornaments at both sites and 40–45% of the finished ornaments. But there are differences in which nacreous ornaments were finished. Placas, the most common ornament at Ejutla, are also prevalent at Monte Albán (Figure 8.31), but nacreous beads and pendants are considerably more abundant at Monte Albán (Figure 8.32) than at Ejutla (Table 8.9, see Table 8.4 for Ejutla), and unperforated shell disks like those at Ejutla are present in much lower quantities at Monte Albán. We suspect that at least some of these unfinished disks are blanks for disk beads, and once perforated, they would look like the perforated nacreous disk beads at Ejutla (some of which are also present at Monte Albán). Other common bivalves are *Spondylus* sp. and *Chama* sp., both of which were used for ornamentation in prehispanic Mesoamerica, prized for their colorful shells (Moholy-Nagy 1994a; Velázquez Castro and Melgar Tísoc 2021). There are low numbers of beads, pendants, and placas of both genera at both sites (Figure 8.33). Most other bivalves are present in very low numbers and often with no evidence of working.

The pattern for gastropods is different (see Table 8.8). Although many of the same taxa are present, large gastropods, including *Strombus* sp. and *Patella mexicana*, are much more abundant at Ejutla (30% of the assemblage) than at Monte Albán (5.5%). At both sites, bracelets are the most common ornament made from *Patella*, while beads were often made from large gastropods. It was not possible to positively identify the taxa of many finished matte white beads, but even given the possibility that they were made from large gastropods, the proportions rise to 40% at Ejutla and only to 13% at Monte Albán. In contrast, whereas many different small gastropods are found at bth sites, they are much more common at Monte Albán (491 vs. 178 at Ejutla), especially as perforated whole shell beads and pendants (258 at Monte Albán vs. 21 at Ejutla). Among the most common at Monte Albán are olive shells (*Oliva* sp., *Olivella* sp., *Agaronia* sp.) and turret shells (*Turritella* sp.), which often were perforated for stringing as beads and pendants. Of these, only *Oliva* is present at Ejutla in any quantity above a half dozen. Other small gastropods are present in very low numbers at both sites, but most are proportionately much more common at Monte Albán, given the much greater quantities of shell overall at Ejutla (see Tables 8.3 and 8.8), such as cone shells (*Conus* sp.), cowrie shells (*Cypraea* sp.), marginellas (*Marginella* sp., *Persicula* sp.), dove shells (*Mitrella* sp., *Pyrene* sp.), dogwinkles

Table 8.6. The shell assemblage at Monte Albán by class.

All analyzed collections at Monte Albán					
Shell category	**Bivalve**	**Gastropod**	**Scaphopod**	**Unidentified**	**Total**
broken shell	1143	229	–	53	1425
worked shell	936	62	–	4	1002
whole shell (unmodified)	81	90	–	2	173
unfinished ornament	221	51	–	5	277
finished ornament	418	295	1	228	942
total	2799	727	1	292	3819
Non-shell-working areas					
Shell category	**Bivalve**	**Gastropod**	**Scaphopod**	**Unidentified**	**Total**
broken shell	487	194	–	47	728
worked shell	196	49	–	4	249
whole shell (unmodified)	80	83	–	2	165
unfinished ornament	133	46	–	5	184
finished ornament	355	269	1	227	852
total	1251	641	1	285	2178
Shell-working area on the west side of the North Platform					
Shell category	**Bivalve**	**Gastropod**	**Scaphopod**	**Unidentified**	**Total**
broken shell	656	35	–	6	697
worked shell	740	13	–	–	753
whole shell (unmodified)	1	7	–	–	8
unfinished ornament	88	5	–	–	93
finished ornament	63	26	–	1	90
total	1548	86	–	7	1641

Table 8.7. Shell species at Monte Albán.

Bivalves		
Genus	**Species**	**Common name**
Anadara	*mazatlanica* (?)	ark shell
Arca	*pacifica*	ark shell
Barbatia (?)	sp.	ark shell
Chama	*buddiana*	jewel box
Chama	*echinata* (*C. coralloides*)	jewel box
Chama	*frondosa* (?)	jewel box
Chama	*squamuligera* (?)	jewel box
Choromytilus	*palliopunctatus* (?)	mussel
Donax	*navicula* (?)	bean clam
Donax	*transversus* (?)	bean clam
Dosinia (?)	sp.	Venus clam
Glycymeris	*gigantea*	bitterweet shell
Lophocardium (?)	sp.	?
Lucina	sp.	lucine
Macoma	*siliqua* (?)	macoma
Mactrellona	*clisia*	surf clam
Margaritifera (?)	sp.	freshwater mussel
Ostrea	*conchaphila*	oyster
Ostrea	*fisheri*	fisher's oyster
Ostrea	*iridesens*	oyster
Ostrea	*palmula*	oyster
Periglypta	*multicostata*	Venus clam
Pinctada	*mazatlanica*	pearly oyster
Pitar	*frizzelli*	pearly oyster
Pitar	*lupanaria* (?)	Venus clam
Pitar	*tortuosus* (?)	Venus clam
Polymesoda (?)	sp.	marsh clam
Protothaca	sp.	Venus clam
Pteria	*sterna* (?)	winged oyster
Sanguinolaria	sp.	gari shell
Spondylus	*calcifer* (*S. limbatus*)	spiny oyster
Spondylus	*princeps* (*S. crassisquama*)	spiny oyster
Tagelus (?)	sp.	gari shell
Tellina	sp.	tellin
Tivela	*delessertii* (?)	Venus clam

(*Continued*)

Tivela	*planulata*	Venus clam
Trachycardium	*consors*	cockle shell
Ventricolaria	*isocardia* (?)	Venus clam
Gastropods		
Genus	**Species**	**Common name**
Acmaea	*discors*	small limpet
Acmaea	*fascicularis*	small limpet
Acmaea	*pediculus*	small limpet
Agaronia	*propatula*	olive shell
Agaronia	*testacea*	olive shell
Anachis	*scalarina*	dove shell
Astraea	*olivacea*	olive turban
Astraea	*unguis*	turban
Cassis	*madagascarensis*	helmet
Cassis	*tenius* (?)	helmet
Cassis	*tuberosa* (?)	helmet
Cerithidea	*albonodosa*	horn shell
Cerithidea	*montagnei* (?)	horn shell
Cerithium	*stercusmuscarum*	horn shell
Conus	*fergusoni*	cone shell
Conus	*nux* (?)	cone shell
Conus	*purpurascens* (?)	cone shell
Conus	*regularis*	cone shell
Conus	*virgatus* (?)	cone shell
Conus	*princeps*	cone shell
Crepidula	*aculeata*	prickly slipper shell
Crucibulum	*scutellatum*	cup and saucer limpet
Cymatium	*lignarium*	triton
Cymatium	*wiegmanni*	triton
Cypraea	*arabicula*	cowrie
Cypraea	*cervinetta*	cowrie
Diodora	*inaequalis*	keyhole limpet
Engina	*pulchra*	small whelk
Ficus	sp.	fig shell
Fissurella	*gemmata*	keyhole limpet
Fissurella	*longifissa* (?)	keyhole limpet
Fissurella	*rugosa* (?)	keyhole limpet
Fossarus	sp.	fossarus
Fusinus	sp.	spindle shell
Haliotis	*fulgens*	green abalone
Haliotis	*rufrescens*	red abalone
Hexaplex (?)	sp.	rock shell
Janthina	*globosa or prolongata*	violet snail
Jenneria	*pustulata*	sea button
Lamellaria	*inflata*	wide-mouth snail
Latirus	*ceratus*	tulip shell
Latirus	*socorroensis*	tulip shell
Littorina	*conspersa*	periwinkle
Malea	*ringens*	cask shell
Marginella	*apicina*	marginella
Marginella	*curta*	marginella
Mitrella	*delicata*	dove shell
Mitrella	*lalage*	dove shell
Morum	*tuberculosum*	helmet
Muricanthus	*princeps* (?)	rock shell
Nassarius	*luteostoma* (?)	dog whelk
Natica	*chemnitzi* (?)	moon shell
Natica	*broderipiana* (?)	moon shell
Nerita	*scabricosta*	nerite
Neritina	*meleagris*	nerite
Neritina	*reclivata*	nerite
Oliva	*incrassata*	olive shell
Oliva	*polpasta*	olive shell
Oliva	*porphyria*	olive shell
Oliva	*splendidula* (?)	olive shell
Olivella	*alba* (?)	olive shell
Olivella	*dama*	olive shell
Olivella	*gracilis* (?)	olive shell
Olivella	*morrisoni* (?)	olive shell
Olivella	*volutella* (?)	olive shell
Olivella	*walkeri* (?)	olive shell
Olivella	*zanoeta* (?)	olive shell
Patella	*mexicana* (*Ancistromesus mexicanus*)	giant limpet
Persicula	*imbricata* (?)	marginella
Petaloconchus	*flavescens* (?)	worm shell
Planaxis	*obsoletus*	grooved snail
Pyrene	*fuscata*	dove shell
Pyrene	*lucasana*	dove shell
Pyrene	*major*	dove shell
Siphonaria (?)	sp.	false limpet
Strombus	*galeatus*	conch shell
Strombus	*gracilior*	conch shell
Tegula	sp.	pearly top shell
Terebra (?)	sp.	auger shell
Thais	*biserialis* (?)	dogwinkle
Thais	*speciosa*	dogwinkle
Thais	*triangularis*	dogwinkle
Trivia	*radians* (?)	sea button
Turritella	*leucostoma*	turret
Scaphopods		
Dentalium	*pretiosum* (?)	tusk shell

Table 8.8. Quantity of each shell genus identified at Monte Albán.

Class	Genus	Quantity
Bivalve	*Anadara*	5
Bivalve	*Arca*	1
Bivalve	*Barbatia*	1
Bivalve	*Chama*	289
Bivalve	*Choromytilus*	1
Bivalve	*Donax*	8
Bivalve	*Dosinia* (?)	1
Bivalve	*Glycymeris*	3
Bivalve	*Lophocardium* (?)	1
Bivalve	*Lucina*	1
Bivalve	*Macoma*	1
Bivalve	*Mactrellona*	1
Bivalve	*Margaritifera* (?)	3
Bivalve	*Ostrea*	5
Bivalve	*Periglypta*	1
Bivalve	*Pinctada*/nacreous	2290
Bivalve	*Pitar*	3
Bivalve	*Polymesoda/Cyrenoida*	2
Bivalve	*Protothaca*	1
Bivalve	*Pteria*	3
Bivalve	*Sanguinolaria*	1
Bivalve	*Spondylus*	93
Bivalve	*Tagelus* (?)	1
Bivalve	*Tellina*	4
Bivalve	*Tivela*	3
Bivalve	*Trachycardium*	1
Bivalve	*Ventricolaria*	1
Gastropod	*Acmaea*	12
Gastropod	*Agaronia*	14
Gastropod	*Anachis*	1
Gastropod	*Astraea*	8
Gastropod	*Cassis*	4
Gastropod	*Cerithidea*	7
Gastropod	*Cerithium*	4
Gastropod	*Conus*	13
Gastropod	*Crepidula*	1
Gastropod	*Crucibulum*	5
Gastropod	*Cymatium*	2
Gastropod	*Cypraea*	13
Gastropod	*Diodora*	3
Gastropod	*Engina*	1
Gastropod	*Ficus*	1
Gastropod	*Fissurella*	13
Gastropod	*Fossarus*	1
Gastropod	*Fusinus*	1
Gastropod	*Haliotis*	8
Gastropod	*Hexaplex* (?)	2
Gastropod	*Janthina*	1
Gastropod	*Jenneria*	2
Gastropod	*Lamellaria*	1
Gastropod	*Latirus*	6
Gastropod	*Littorina*	1
Gastropod	*Malea*	4
Gastropod	*Marginella*	33
Gastropod	*Mitrella*	19
Gastropod	*Morum*	6
Gastropod	*Muricanthus*	2
Gastropod	*Nassarius*	2
Gastropod	*Natica*	2
Gastropod	*Nerita*	3
Gastropod	*Neritina*	7
Gastropod	*Oliva*	106
Gastropod	*Olivella*	101
Gastropod	*Patella*	9
Gastropod	*Persicula*	2
Gastropod	*Petaloconchus*	2
Gastropod	*Planaxis*	1
Gastropod	*Pyrene*	9
Gastropod	*Siphonaria* (?)	1
Gastropod	*Strombus*	14
Gastropod	*Tegula*	2
Gastropod	*Terebra* (?)	1
Gastropod	*Thais*	9
Gastropod	*Trivia*	2
Gastropod	*Turritella*	70
Scaphopod	*Dentalium*	1

(*Thais* sp.), horn shells (*Cerithidea* sp., *Cerithium* sp.), sea buttons (*Jenneria* sp., *Trivia* sp.), moon shells (*Natica* sp.), turban shells (*Astraea* sp.), pearly top shells (*Tegula* sp.), nerites (*Nerita* sp., *Neritina* sp.), helmets (*Morum* sp.), periwinkles (*Littorina* sp.), and dog whelks (*Nassarius* sp.). Two small limpets are present at both sites (*Acmaea* sp. and *Fissurella* sp.); others are present only at Monte Albán (*Crucibulum* sp., *Diodora* sp.). Many of these small limpets have natural holes that were enlarged for stringing. For all these genera, the same species often are not present at both sites. These small shells may have been traded to Monte Albán and Ejutla by various routes.

An important difference between the shell assemblages at Ejutla and Monte Albán is the much greater proportion of ornaments at Monte Albán (32% vs. 4.3% at Ejutla) and especially finished ornaments, approximately one-quarter of the assemblage (24.7%) at Monte Albán compared to <1% at Ejutla (see Tables 8.1 and 8.6). The Monte Albán shell ornament assemblage is dominated by beads (47%), pendants (19%), and placas (26%). Most of the beads are

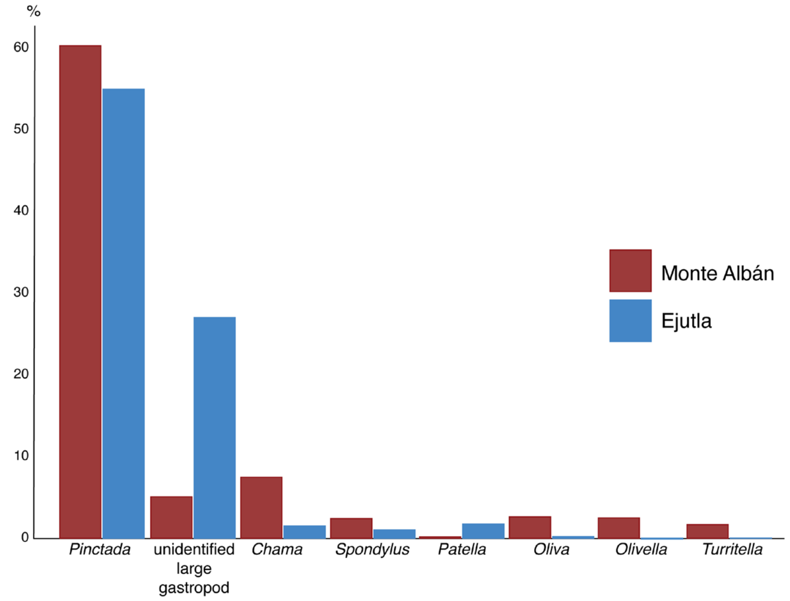

Figure 8.30. Comparison of principal shell genera at Monte Albán and Ejutla by percentage (only includes taxa that are at least 1% at one of the two sites).

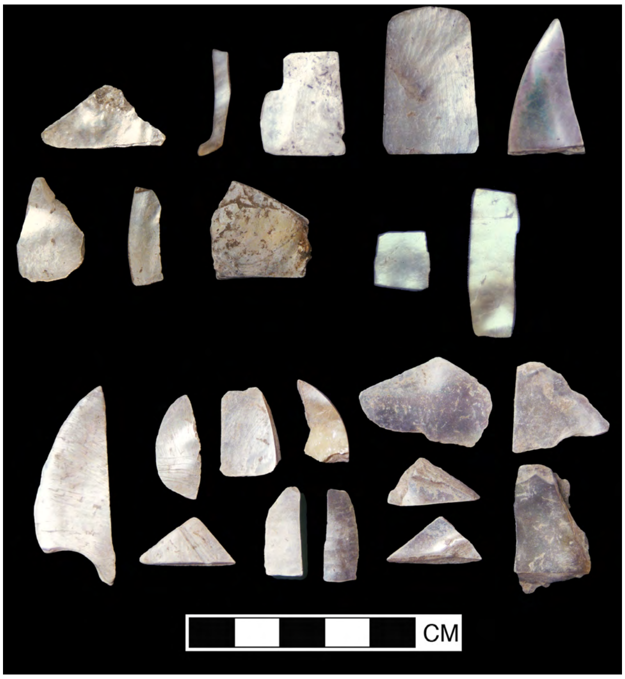

Figure 8.31. Sample of *Pinctada* placas from Monte Albán.

formed thin disk beads (mostly matte white and some *Pinctada*) and larger tabular beads (mostly *Pinctada*) (Figure 8.34), and whole shell beads (small gastropods) (Figure 8.35). Most of the beads are finished. The majority of the pendants are natural small gastropods that have been perforated (see Figure 8.35); the remaining formed pendants have a variety of quadrangular and curvilinear forms, with tabular or rectangular more common than other shapes (see Figure 8.32). Most of the formed pendants were made from *Pinctada*. Over 75% of the pendants are finished, whereas fewer than half of the placas are finished. Most placas were also made of *Pinctada*, in a wide variety of shapes, with triangles, rectangles, trapezoids, diamonds, and crescents the most common (Table 8.10). Some of the placas could be unperforated bead blanks, along with a small number of shell disks, while finished placas and disks could have been used as mosaic inlay.

There is less broken and worked shell at Monte Albán, approximately 63% of the assemblage compared to more than 95% at Ejutla. These differences in quantities of ornaments and shell debris are not surprising given the contexts from which much of the shell was collected at Monte Albán, whereas the shell from Ejutla comes exclusively from a shell-working context. The differences are even greater when we separate out the shell from the Conjunto Plataforma Norte Lado Poniente, an area where shell working occurred, based on the nature of the shell assemblage (see also Martínez López and Markens 2004). That one context alone (n = 1643, wgt. = 2.5 kg) accounts for 43% of all the shell that we analyzed at Monte Albán. For the rest of the shell assemblage at Monte Albán, ornaments account for almost half (48%) of the assemblage, with many more finished ornaments (39%) than unfinished ones (8.4%). These contexts were clearly receiving shell ornaments crafted elsewhere, either on site or from afar, and were not making ornaments in any large numbers.

In many respects, the assemblage from the complex on the west side of the North Platform looks a lot like the assemblage in the domestic shell-working area at Ejutla (see Appendix 7, Figure 8.36). Approximately 11% are ornaments, about half finished and half unfinished. The most common ornaments are placas (>60%). There also are high quantities of worked shell (46%) and unworked broken shell (42%). But shell working in this context was limited almost entirely to nacreous shell, primarily *Pinctada*, which accounts for 92% of the shell here (n =

Figure 8.32. Nacreous beads and pendants from Monte Albán.

1510), plus more than 1000 tiny flakes or chipping debris weighing only 200 g that we do not include in the total count; many of these tiny pieces may have simply flaked off of larger nacreous debris or broken ornaments (compared to Ejutla, where nacreous shell was 61% of all shell, with 4.3 kg of uncounted chipping debris). There are only a few pieces of *Spondylus* (n = 6) and *Chama* (n = 15), mostly broken fragments with no evidence of working and a few ornaments. Gastropods are fairly evenly divided between small snail shells (42 comprising 17 different genera, with more *Olivella* and *Turritella* than the others) and larger gastropods (44, most unidentified but a few *Strombus*), both ~2.5% of the assemblage. The craftworkers may have perforated small snail shells for stringing, but given the very low amounts of modified fragments from large gastropods in this context, there is minimal evidence that the large shells were crafted into ornaments for exchange in this context.

In analyzing the shell from the west side of the North Platform, and the ornaments from the other contexts, we saw the same techniques that the Ejutleño artisans used to craft ornaments (e.g., Feinman and Nicholas 2000), including techniques that Melgar Tísoc et al. (2010, 2018) have documented through experimental analyses at Monte Albán—cutting shell with sharp obsidian and chert blades and flakes, perforating beads and pendants with small chert drills and pointed flakes, and shaping ornaments with basalt abraders. These techniques have been documented elsewhere in Mesoamerica (Emery and Aoyama 2007; Suárez 1977, 1981; Velázquez Castro et al. 2019) and are not unique to Oaxaca, Ejutla, or Monte Albán. While many placas and worked debris have string-cut edges, many others were cut with sharp-edged stone tools. The edges of many placas were abraded very smooth, removing any evidence of whether string or a stone tool was used initially to cut the ornament blank. Regardless of the tools used, many placas are very similar to those we found at Ejutla. There were only a few disks (12) in this context, proportionally many fewer than in Ejutla; most were abraded, but two had been cut with a tubular drill (most likely cane), and several pieces of discarded worked shell have cut marks made with a tubular drill. There were approximately two dozen each of beads and pendants, accounting for ~25% of the ornaments in this context, half of which are small whole gastropods perforated for stringing by abrading (often with string) an opening in the shell wall, or in thinner shells by punching a hole in the shell wall or cutting off the top of the spire. Formed beads were abraded, while pendants were formed by cutting with string or a sharp stone tool, and then abrading the edges smooth. Given the low number of disks, the craftworkers' main focus appears to have been on making tabular pieces that were finished into pendants, beads, or mosaic inlay. Mixed with the shell debris were hundreds of blades and flakes of obsidian, chert, and quartz, and a small number of perforators (Martínez López and Markens 2004, 85). The obsidian blades were well used, like those at Ejutla (see also Lewenstein 1987). The presence of rejuvenation flakes indicates resharpening of blades and perforators as

Table 8.9. Shell ornaments by genus at Monte Albán.

Genus	Bead	Bead/ pendant	Bracelet	Button	Cube	Disk	Earspool	Ornament blank	Pearl	Pectoral	Pendant	Placa	Ring	Trumpet	Unknown ornament	Whole shell	Total
Bivalve	**186**	**3**	**5**	**5**	**1**	**31**	**–**	**11**	**1**	**2**	**108**	**280**	**1**	**–**	**5**	**81**	**720**
Arca	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Chama	1	–	–	–	–	–	–	1	–	–	4	–	–	–	–	64	70
Chama (?)	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Choromytilus (?)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Donax	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2
Glycymeris	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Glycymeris (?)	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Macoma (?)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Margaritifera (?)	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	2
nacreous/*Pinctada*	71	3	–	4		21	–	3	–	–	54	195	–	–	5	–	356
Ostrea	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2
pelecypod UID	2	–	–	–	–	1	–	–	1	–	3	–	–	–	–	6	13
Pinctada	96	–	2	1		7	–	2	–	1	16	34	–	–	–	1	160
Pinctada (?)	9	–	–	–	–	2	–	3	–	1	22	32	1	–	–	–	70
Pitar	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Polymesoda (?)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Pteria (?)	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1
Spondylus	3	–	–	–	1	–	–	2	–	–	6	18	–	–	–	–	30
Spondylus (?)	4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4
Tivela	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Gastropod	**178**	**–**	**3**	**–**	**–**	**4**	**2**	**13**	**–**	**–**	**117**	**23**	**4**	**1**	**1**	**90**	**436**
Acmaea	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	4	5
Acmaea (?)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Agaronia	–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	5
Agaronia (?)	1	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	2
Agaronia/Oliva	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Agaronia/Olivella	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Anachis	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Astraea	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Cerithidea	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	4	6

Genus	Bead	Bead/ pendant	Bracelet	Button	Cube	Disk	Earspool	Ornament blank	Pearl	Pectoral	Pendant	Placa	Ring	Trumpet	Unknown ornament	Whole shell	Total
Cerithidea (?)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Cerithium	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	2	3
Conus	–	–	–	–	–	–	–	–	–	–	6	–	–	–	1	–	7
Crepidula	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Crucibulum	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	3
Cypraea	1	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	2
Diodora	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1	2
Diodora (?)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Engina	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Ficus	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1
Fissurella	–	–	–	–	–	–	–	–	–	–	4	–	–	–	–	5	9
Fissurella (?)	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Fossarus	–	–	–	–	–	–	–	–	–	–	–		–	–	–	1	1
gastropod UID	29	–	–	–	–	2	2	9	–	–	7	19	4	–	–	–	72
Haliotis	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	1
Hexaplex (?)	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1
Jenneria	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Lamellaria	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Latirus	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	4	5
Littorina	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Malea (?)	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Marginella	29	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	32
Mitrella	14	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	15
Mitrella (?)	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Morum	–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	–	5
Nassarius	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2
Natica (?)	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1
Nerita	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	3
Neritina	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	6	7
Oliva	1	–	–	–	–	–	–	–	–	–	56	–	–	–	–	2	59
Oliva (?)	–	–	–	–	–	1	–	–	–	–	4	–	–	–	–	–	5

(*Continued*)

Genus	Bead	Bead/ pendant	Bracelet	Button	Cube	Disk	Earspool	Ornament blank	Pearl	Pectoral	Pendant	Placa	Ring	Trumpet	Unknown ornament	Whole shell	Total
Olivella	85	–	–	–	–	–	–	–	–	–	1	–	–	–	–	5	91
Olivella (?)	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Patella	–	–	1	–	–	–	–	1	–	–	–	–	–	–	–	1	3
Patella (?)	–	–	2	–	–	–	–	1	–	–	–	–	–	–	–	–	3
Persicula	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Planaxis	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Pyrene	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	6
Siphonaria (?)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Strombus	–	–	–	–	–	–	–	2	–	–	2	2		1	–	1	8
Tegula (?)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1
Thais	6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	7
Turritella	–	–	–	–	–	–	–	–	–	–	9	–	–	–	–	33	42
Scaphopod	**1**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**1**
Dentalium	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1
Unidentified	**213**	**–**	**3**	**–**	**–**	**1**		**1**	**–**	**–**	**6**	**8**	**–**	**–**	**1**	**2**	**235**
Total	**578**	**3**	**11**	**5**	**1**	**36**	**2**	**25**	**1**	**2**	**231**	**311**	**5**	**1**	**7**	**173**	**1392**

Figure 8.33. ***Spondylus*** **placas from Monte Albán.**

Figure 8.34. ***Pinctada*** **disks and tabular beads from Monte Albán.**

Figure 8.35. Whole shell beads and pendants at Monte Albán, small olive and marginella shells (top) and ***Oliva porphyria*** **(bottom).**

Table 8.10. Types of shell ornaments at Monte Albán by class.

Ornament category	Bivalves	Gastropods	Scaphopods	UID	Total
Bead	**186**	**178**	**1**	**213**	**578**
cylindrical	6	2	–	1	9
flat disk	7	18	–	184	209
miniature	3	8	–	17	28
other form	10	2	1	11	24
tabular	159	–	–	–	159
whole shell bead	1	148	–	–	149
Bead/pendant	**3**	**–**	**–**	**–**	**3**
Bracelet	**5**	**3**	**–**	**3**	**11**
Button	**5**	**–**	**–**	**–**	**5**
Cube	**1**	**–**	**–**	**–**	**1**
Disk	**31**	**4**	**–**	**1**	**36**
abraded disk	19	4	–	1	24
tubular cut	12	–	–	–	12
Earspool	**–**	**2**	**–**	**–**	**2**
Ornament blank	**11**	**13**	**–**	**1**	**25**
Pearl	**1**	**–**	**–**	**–**	**1**
Pectoral	**2**	**–**	**–**	**–**	**2**
Pendant	**108**	**117**	**–**	**6**	**231**
anthropo/zoomorphic	15	3	–	2	20
circular	11	–	–	1	12
cruciform	–	–	–	1	1
dagger-shaped	2	–	–	–	2
engraved	5	1	–	–	6
irregular	5	1	–	–	6
J-shaped	2	1	–	–	3
other angular form	2	–	–	–	2
other shape	4	2	–	–	6
rectangular	18	1	–	–	19
ring-shaped	1	1	–	–	2
square	4	–	–	–	4
tabular	19	2	–	2	23
teardrop	1		–	–	1
trapezoidal	6	1	–	–	7
triangular	7	–	–	–	7
whole shell pendant	6	104	–	–	110
Placa	**280**	**23**	**–**	**8**	**311**
anthropo/zoomorphic	7	–	–	1	8
arrow-shaped	8	1	–	–	9
circular	3	1	–	–	4
crescent	13	1	–	–	14
cruciform	1	–	–	–	1
curvilinear	4	2	–	–	6
engraved/incised	4	1	–	–	5
flower	1	1	–	–	2
irregular	25	1	–	3	29
letter-shaped	14	–	–	–	14
notched/serrated	9	1	–	1	11

Ornament category	Bivalves	Gastropods	Scaphopods	UID	Total
other angular	9	1	–	–	10
rectangular	64	4	–	1	69
square	13	–	–	–	13
star-shaped	1	–	–	–	1
tabular	22	4	–	–	26
teardrop	2	–	–	1	3
trapezoidal	12	2	–	–	14
triangular	62	3	–	–	65
unclear form	6	–	–	1	7
Ring	**1**	**4**	**–**	**–**	**5**
Trumpet	**–**	**1**	**–**	**–**	**1**
Unknown ornament	**5**	**1**	**–**	**1**	**7**
Unmodified whole shell	**81**	**90**	**–**	**2**	**173**
Total	**720**	**436**	**1**	**235**	**1392**

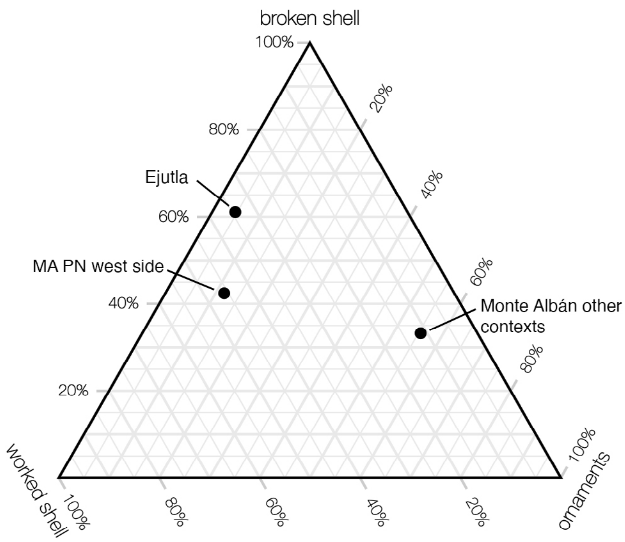

Figure 8.36. Ternary chart showing proportions of ornaments, worked shell, and broken shell at Ejutla, the shell-working area on the west side of the North Platform, and all other contexts at Monte Albán.

they were worn down by working the hard shell. There was much less ground stone, only 17 hammerstones to break up the shells, most of which are chert, and many fewer other forms, such as manos, polishers, anvils, axes, or chisels (Martínez López and Markens 2004, 88–89). It is not clear from the reporting how many, if any, of the other tools are basalt.

Because of the limited evidence that the shell workers in the Conjunto Plataforma Norte Lado Poniente worked shell genera other than *Pinctada* and the high volume of shell ornaments in the collections we analyzed at Monte Albán, we suspect that many of those ornaments were made elsewhere at Monte Albán, or at another shell-working site. There is minimal evidence that shell working was carried out in any of the other archaeological contexts we analyzed, or at least it did not occur at scale. During the survey of Monte Albán, Richard Blanton (1978, 77–79) recorded sparse quantities of shell on ~6% of all terraces spread across Monte Albán; he also identified several possible shell-working areas by denser than usual quantities of shell on the surface, in his words, "that 10 or more pieces could be sighted in a small area immediately and that if a surface collection were to be made hundreds or even thousands of pieces could be picked up."

All of the terraces with possible shell working are on Monte Albán's main hill, on several sides of the Main Plaza (Blanton 1978, figure 4.29). All are on residential terraces, several of which are clustered in what appear to be small barrios of artisans who crafted shell ornaments (Figure 8.37). The largest cluster includes five terraces with abundant surface shell off the southwest corner of the Main Plaza. Several other shell-working terraces are below the eastern side of the Main Plaza, and another one is to the north. Although none of these areas have been investigated further, they remain possible sources for the shell ornaments that we analyzed from the contexts on the Main Plaza.

Yet just because shell working occurred in at least one context at Monte Albán, that does not rule out the possibility that shell ornaments crafted elsewhere were traded to Monte Albán. As an example, ceramic production is well documented at Monte Albán (e.g., Markens and Martínez López 2009), yet a compositional analysis of ceramics from across the valley found that a small amount of pottery at Monte Albán was not made at the site itself (Minc et al. 2015). The same pattern was even clearer at El Palmillo, where we found several small ceramic firing features; most of the tested pottery was made from clays near El Palmillo, yet 18% was made from clays in western Tlacolula. Local production of a good does not preclude all residents of a site from obtaining similar classes of that good produced elsewhere.

Given the similarity in the species, the techniques used to work the shell, and the kinds of ornaments in both

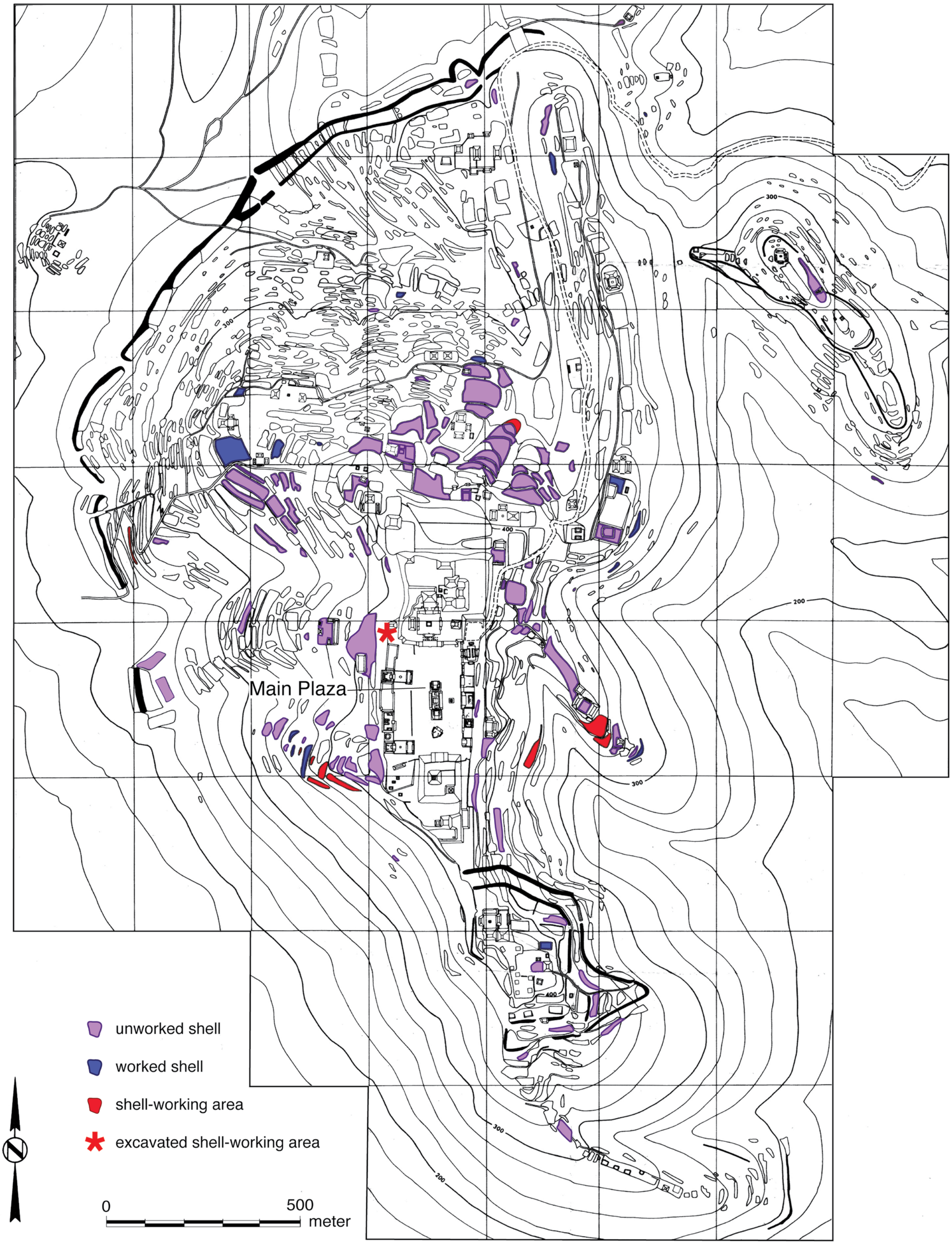

Figure 8.37. Map of Monte Albán, showing location of the Main Plaza, areas where shell and indications of shell working were found during the surface survey of the site (data from Blanton 1978, appendix 1), and the excavated shell-working area on the west side of the North Platform.

contexts, we also cannot rule out that some of the shell at Monte Albán came from Ejutla, including beads or other ornaments made from large gastropods, as well as blanks and unworked shell (e.g., Feinman and Nicholas 1995c, 2000; contra Melgar Tísoc et al. 2010, 2018). The amount of broken gastropod debris at Ejutla far exceeded the number of (even partial) ornaments. These larger and heavier shells may have been more difficult to transport and so were at least initially broken and processed at Ejutla; this would help explain the high amounts of unworked debris from these large shells at Ejutla. At Ejutla, large gastropods account for 30% of the shell assemblage, with only 3.5% finished or unfinished ornaments compared to 20% in the Conjunto Plataforma Norte Lado Poniente. *Spondylus* and *Chama*, both as unworked shells and as ornaments, also may have arrived at Monte Albán by way of Ejutla.

Surveys and excavations in the Valley of Oaxaca have found few sites with high-intensity shell working. Shell was recorded on the surface of only 20 sites during surveys in the Valley of Oaxaca (out of 2700, including Monte Albán; Kowalewski et al. 1989). The relative abundance of surface shell was greater in the southern parts of the central valleys, 21 out of 423 sites in Ejutla (Feinman and Nicholas 1992, 1993) and 8 out 120 sites in the Sola Valley (Balkansky 2002; Nicholas and Feinman 2002). At most sites only one or two pieces of shell were noted.

Only at Monte Albán and Ejutla have dense surface scatters of marine shell been recorded and then (through subsequent excavation and analysis) shell working documented. Although shell ornaments and broken debris are not rare finds in our excavations at El Palmillo, Lambityeco, and the Mitla Fortress (Feinman and Nicholas 2009, 2011b, 2016b) or those of colleagues elsewhere in the valley (Feinman and Nicholas 2007e), the quantities are generally very low, and there is no evidence of shell working at any level of intensity. Shell ornaments generally are more abundant in higher-status contexts but have been found in non-elite houses (Feinman and Nicholas 2009, 2011b) and in child burials (González Licón 2009; Feinman and Nicholas 2007e).

In spite of high-intensity shell ornament production at Ejutla, there was only one bead in the tomb and only a few other finished shell ornaments in the house, including the two carved pendants (see Figure 8.27). This household and the local community were not consuming most of the shell ornaments made by the Ejutla craftworkers, in contrast to artisans at the Xalla palace at Teotihuacan (Velázquez Castro et al. 2019) or the Maya sites of Aguateca and Tikal (Inomata and Emery 2014; Moholy-Nagy 2008) or at Monte Albán, where finished ornaments were a far larger component of shell assemblages. So, for whom were the Ejutla artisans making the ornaments? Consumers at Monte Albán are one reasonable answer. Given that shell ornaments are most frequently found in elite contexts at Monte Albán and other sites in the valley, including El Palmillo, where we excavated low- and high-status houses, it does not seem likely that the large quantity of shell ornaments made in Ejutla were traded only to nearby communities, all of which were much smaller than Ejutla. One could presume that at least some of the ornaments were crafted for higher-status individuals who lived closer to the site's core in the center of the modern town, where we mapped a ceremonial complex of mounds during the regional survey. Nevertheless, although we were able to collect pottery as we investigated the heavily damaged mounds and surrounding areas, we did not recover a single piece of shell, much less any ornaments. Sourcing studies of obsidian and mica help define prehispanic networks and routes that appear to provide some conceivable answers.

8.7. Obsidian and Travel Routes to the Pacific Coast

In 2012 we started sourcing the obsidian from our excavations using portable XRF (X-ray fluorescence), and now we have sourced more than 20,000 pieces of obsidian from more than 50 archaeological sites in the state of Oaxaca (Nicholas et al. 2022). There are no obsidian sources in the entire state of Oaxaca, so all obsidian arrived via long-distance exchange (Figure 8.38). We found that obsidian was moving long distances as early

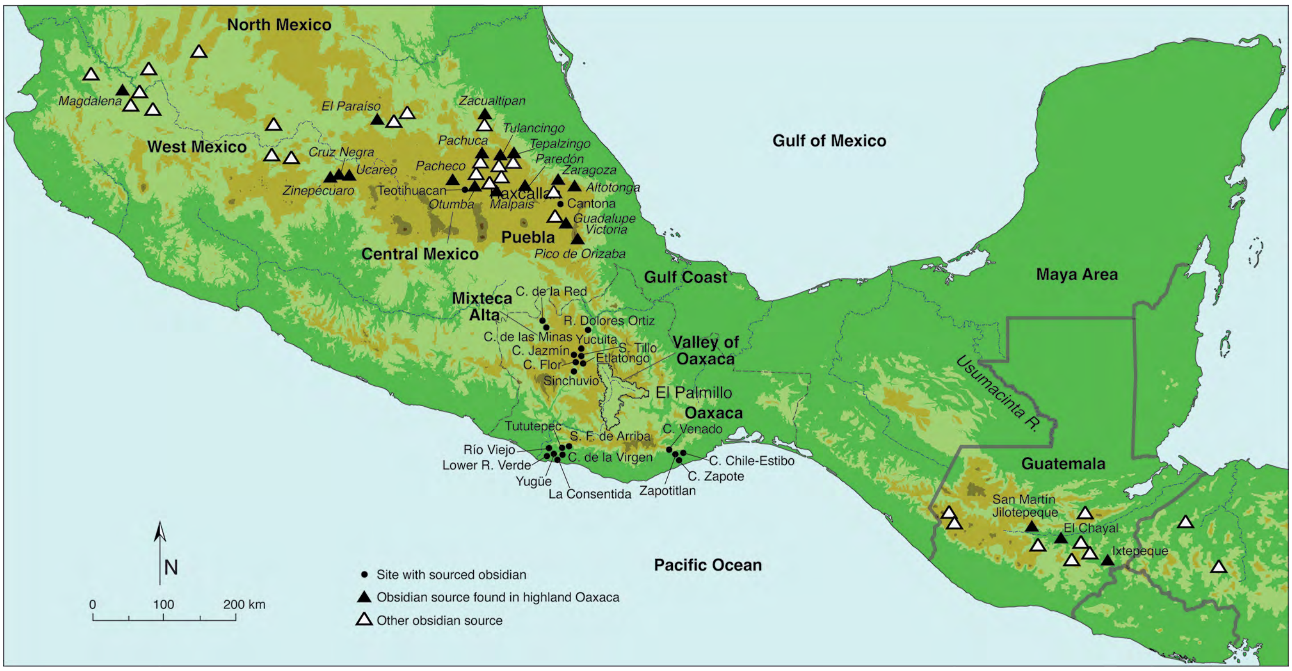

Figure 8.38. Map of Mesoamerican obsidian sources and sites with sourced obsidian (see Figure 8.39 for sites in the Valley of Oaxaca).

as (and likely prior to) the Formative period (Feinman et al. 2022). During the Classic period, when we have the largest sample from sites in Oaxaca, obsidian from a range of sources entered the Valley of Oaxaca along different routes; Pachuca obsidian from Central Mexico entered through the northern arm of the valley, Zaragoza obsidian from Puebla through the eastern arm, and Ucareo obsidian from Michoacan in West Mexico from the south (Figure 8.39; Feinman et al. 2018c; Nicholas et al. 2022). Overall, we identified obsidian from eight different sources in the Ejutla assemblage, so that occupants of this household were linked to a number of different economic networks.

Obsidian from West Mexican sources generally was never as abundant in the Valley of Oaxaca as the Central Mexican or Gulf Coast sources were, yet during the Late Classic period, more than a quarter (28%) of the obsidian at Ejutla was from the Ucareo source in Michoacan, even though Ejutla is more distant from Ucareo (as the crow flies) than are the northern or central parts of the valley, where Ucareo obsidian was much less common (Table 8.11) (Feinman et al. 2018c; Nicholas et al. 2022). The high percentages of Ucareo obsidian associated with Late Classic contexts (Río Viejo, Lower Río Verde) on the southern coast of Oaxaca and in the Mixteca Alta to the west of the Valley of Oaxaca provide evidence of a

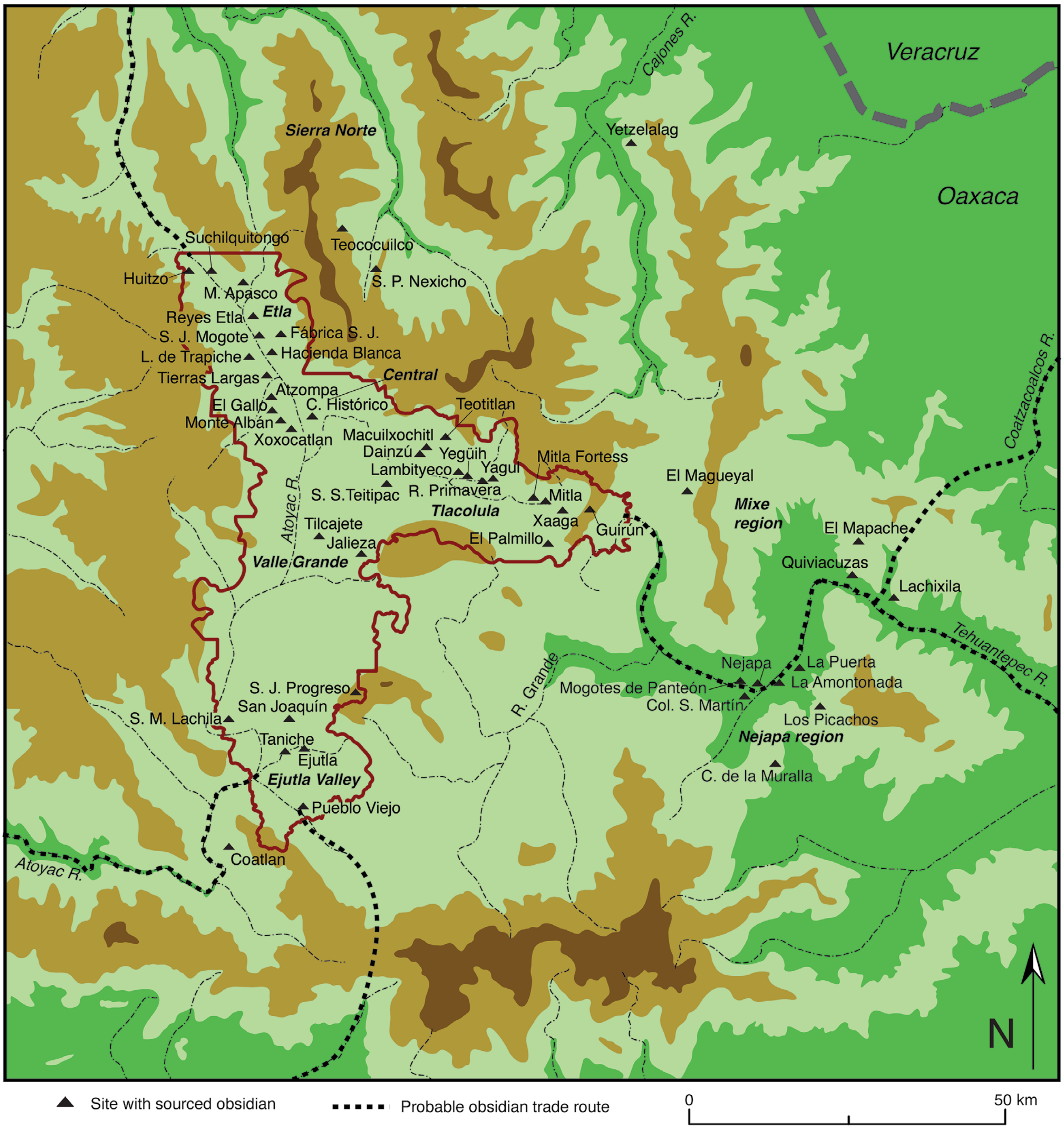

Figure 8.39. Map of highland Oaxaca showing sites with sourced obsidian and the three principal routes into the valley from the north, east, and south.

Table 8.11. Sourced obsidian* at Late Classic period sites in Oaxaca.

Site	Zone	# pieces	# sources	ZP	GP	PV	MH	PP	SH	TH	PH	ZH	OM	UM	CG	IG	SMJ	Unknown
Cerro de las Minas	Mixteca Alta	21	5	10%	14%	–	–	–	24%	–	–	–	19%	33%	–	–	–	–
El Mapache	Mixe	32	4	72%	–	19%	–	–	3%	–	–	–	–	6%	–	–	–	–
Lachixila	Mixe	185	5	90%	–	3%	–	1%	–	–	–	–	1%	5%	–	–	–	–
Quiavicuzas	Mixe	6	2	67%	–	33%	–	–	–	–	–	–	–	–	–	–	–	–
Atzompa	Valley—Central	515	9	66%	7%	3%	–	1%	11%	<1%	–	1%	2%	10%	–	–	–	1%
Ej-Ej-Sj-6	Valley—Ejutla	2	2	50%	–	–	–	–	–	–	–	–	–	50%	–	–	–	–
Ejutla	Valley—Ejutla	1842	8	52%	2%	1%	–	2%	8%	–	–	1%	5%	28%	–	–	–	–
El Gallo (Monte Albán)	Valley—Central	47	6	19%	60%	2%	–	2%	9%	–	–	–	–	6%	–	–	–	2%
El Palmillo	Valley—Tlacolula	1949	11	78%	–	2%	<1%	<1%	8%	<1%		1%	6%	4%	<1%	<1%	–	<1%
Jalieza	Valley—Valle Grande	102	9	75%	2%	1%	–	1%	13%	1%	–	2%	2%	3%	–	–	–	–
Lambityeco	Valley—Tlacolula	1183	9	75%	1%	–	<1%	<1%	9%	<1%	–	<1%	7%	7%	–	–	–	<1%
Loma de Trapiche	Valley—Etla	4	3	50%	–	–	–	25%	25%	–	–	–	–	–	–	–	–	–
Tilcajete (Los Mogotes)	Valley—Valle Grande	60	5	8%	15%	2%	–	–	67%	–	–	–	8%	–	–	–	–	–
Macuilxochitl	Valley—Tlacolula	1008	11	75%	1%	4%	–	2%	9%	<1%	<1%	<1%	6%	3%	<1%	–	–	<1%
Mitla Fortress	Valley—Tlacolula	225	7	68%	–	<1%	–	–	27%	–	–	<1%	2%	2%	<1%	–	–	–
Monte Albán	Valley—Central	3514	12	46%	3%	<1%	–	4%	25%	<1%	–	<1%	4%	17%	<1%	<1%	<1%	<1%
Oc-Sjp-Sjp-129	Valley—Ejutla	15	2	73%	–	–	–	–	–	–	–	–	–	27%	–	–	–	–
Reyes Etla	Valley—Etla	1	1	–	–	–	–	–	100%	–	–	–	–	–	–	–	–	–
Fábrica San José	Valley—Etla	38	7	8%	3%	3%	–	29%	40%	–	–	–	16%	3%	–	–	–	–
Xoxocotlán (4 Mogotes)	Valley—Valle Grande	30	5	47%	–	20%	–	3%	27%	–	–	–	–	3%	–	–	–	–
Nejapa Viejo	Nejapa	1	1	100%	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Lower Río Verde	Lowland Oaxaca	11	5	–	9%	18%	–	–	9%	–	–	–	9%	55%	–	–	–	–
Río Viejo	Lowland Oaxaca	37	4	8%	–	–	–	–	27%	–	–	–	3%	62%	–	–	–	–
San Francisco de Arriba	Lowland Oaxaca	1	1	–	–	–	100%	–	–	–	–	–	–	–	–	–	–	–

*ZP = Zaragoza, GP = Guadalupe Victoria, PV = Pico de Orizaba, MH = Malpaís, PP = Paredón, SH = Sierra de Pachuca, TH = Tulancingo, PH = Tepalzingo, ZH = Zacualtipan, OM = Otumba, UM = Ucareo, CG = El Chayal, IG = Ixtepeque, SMJ = San Martín Jilotepeque route from West Mexico to the Pacific Coast of Oaxaca. Geospatial modeling has predicted the presence of a high-traffic route from the coast to the Mixtec highlands (White and Barber 2012, 2692). Sea trade along the Pacific Coast from West Mexico to Oaxaca as early as the Late Classic also brought a variety of goods to Huatulco, a major port for long-distance trade on the coast south of the central valleys (Ball and Brockington 1978, 112). Whether the West Mexican obsidian arrived on the coast by land or by sea, it most likely entered the Central Valleys of Oaxaca via Miahuatlán, a port of trade at the southern end of the valley system that participated in the Mixteca-to-coast trade network (Ball and Brockington 1978).

Based on geospatial modeling, high-traffic movement into the Valley of Oaxaca is predicted, with these routes converging at Monte Albán (White and Barber 2012, 2694). In spite of Oaxaca's mountainous topography, an abundance of materials from more distant parts of Mesoamerica were brought to Monte Albán and neighboring settlements in the Valley of Oaxaca, including marine shell from the Pacific Coast and obsidian from many sources (Nicholas et al. 2022). The shortest routes to Monte Albán from the coast were from the south (White and Barber 2012, 2686–87), in the direction of Ejutla. Purely in terms of travel time, the least costly routes were through the Ejutla or Sola Valleys, with one of the expected most highly trafficked routes passing through Ejutla (Figure 8.40).

Colonial-era ethnohistoric records from Oaxaca provide independent corroboration that the high-traffic corridors generated by the modeling do approximate the location of routes used during the prehispanic and colonial era for movement and exchange. The modeling also aligns with other archaeological evidence that the highest-traffic route between Monte Albán and the Pacific Coast passed through the Ejutla and Miahuatlán Valleys (Ball and Brockington 1978). Routes through Sola were more arduous (e.g., Bevan 1934). It is likely that West Mexican obsidian and Pacific Coast shell entered the Central Valleys of Oaxaca through Miahuatlán and then were traded north to Ejutla and eventually Monte Albán and elsewhere in the Valley of Oaxaca. Although the proportion of Ucareo obsidian in the assemblage at Monte Albán is much lower than at Ejutla, the city is the only other site in our sample from the valley with any significant amount of Ucareo obsidian (Feinman et al. 2018c; Nicholas et al. 2022), and as we have seen, Monte Albán obtained significant quantities of Pacific Coast shell. The other known prehispanic shell-working site in highland Oaxaca is Miahuatlán, which is along the predicted route to the coast and also has lots of obsidian (unfortunately unsourced), some of which was recovered mixed with shell fragments and debris (Brockington 1973; Markman 1981).

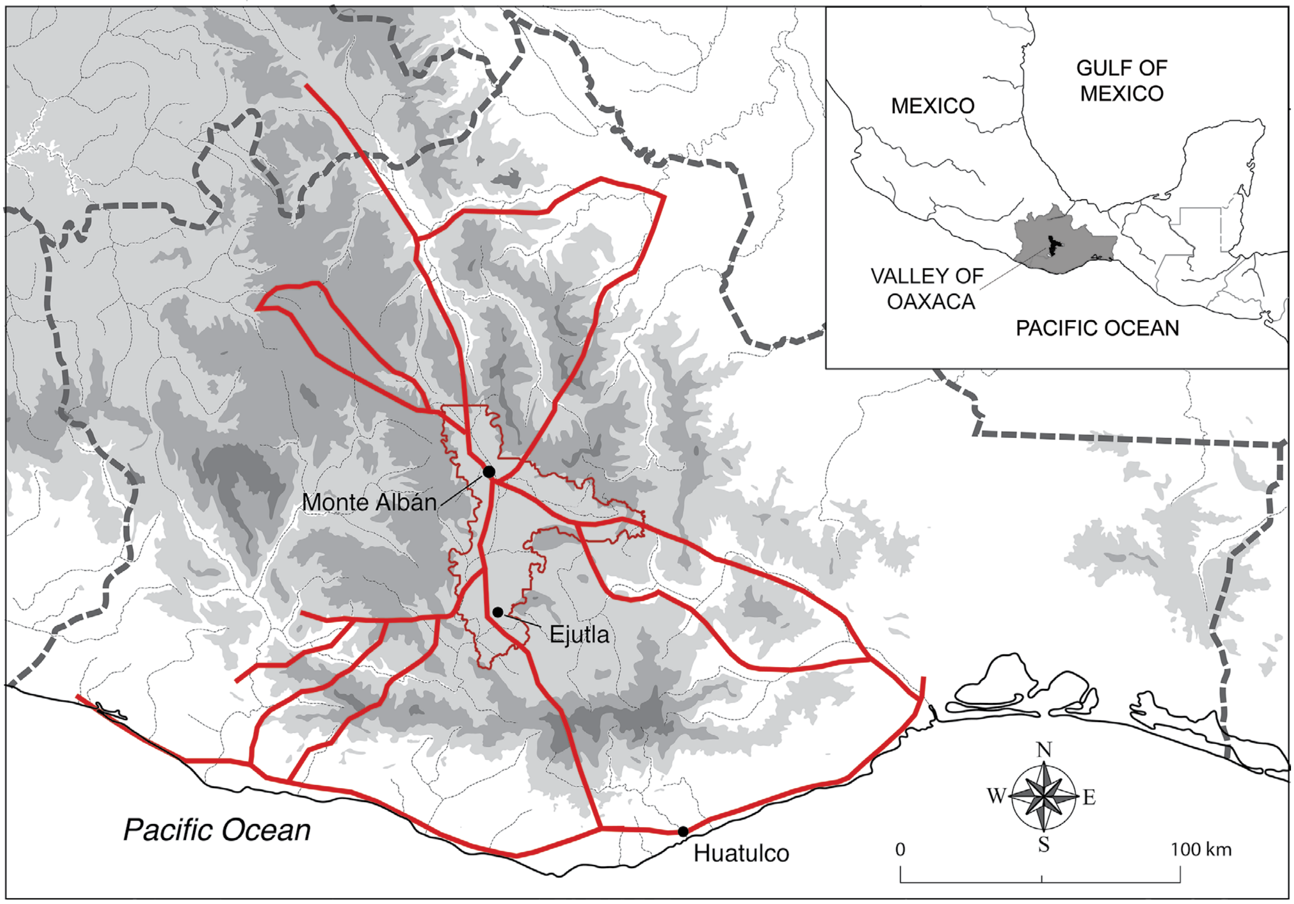

Figure 8.40. Map of Oaxaca showing high-traffic routes (routes from White and Barber 2012, figure 11), including route to Monte Albán from the Pacific Coast that passes through Ejutla.

Borah (1954, 25–28) used colonial records to sketch a similar route from Huatulco (on the Pacific Coast) through the Miahuatlán and Ejutla Valleys into the center of the valley during the 1500s (Figure 8.41). According to Borah (1954, 25), "[t]he additional road from Huatulco to Miahuatlán and Oaxaca City … probably followed one of the more important trails by which the Zapotecs found their way to the Pacific coast." Drawing on archaeological evidence, Ball and Brockington (1978) proposed that this route was in existence by the Late Classic period. That two of the only documented shell-working sites in the Central Valleys of Oaxaca are located in Miahuatlán and Ejutla attests to the importance of this route for bringing marine shells into the Valley of Oaxaca, and possibly beyond. Ejutla has a long history as an important commercial location, serving as a transit center for coastal and other agricultural products entering the valley system (Barrera 1946, 85–86; Beals 1975, 128). Into the twentieth century, the Ejutla market—one of eight major markets in the valley system (Beals 1975, 47; Diskin 1976, 51; Malinowski and de la Fuente 1982, 70)—had the highest percentage of vendors who served as middlemen, buying local produce in bulk to sell or bringing in goods from distant places (Diskin 1976, 59–60), practices indicative of the region's position as a gateway between the highland valleys and the mountains and coast to the south (Feinman and Nicholas 2013, 19; Malinowski and de la Fuente 1982, 84).

Historically, the Valley of Oaxaca was a center of trade routes connecting Central Mexico (to the north) and the Isthmus and beyond (to the south) (Malinowski and de la Fuente 1982, 70). The sixteenth-century route from Central Mexico to Oaxaca—probably along part of a main Aztec route—and then to the Pacific Coast passed through a series of valleys and basins, including the Central Valleys of Oaxaca, that, while longer, was much easier to navigate than the broken, mountainous terrain between Central Mexico and the Pacific Coast near Acapulco (Borah 1954, 25, 28). Another attraction for this route from Central Mexico was productive activities and natural resources in the Central Valleys of Oaxaca (Borah 1954, 25). Which brings us to mica.

One raw material that was imported to Teotihuacan from Oaxaca is mica. There are multiple sources of mica in the Central Valleys of Oaxaca that are distributed from the northern arm of the valley south to Ejutla and Miahuatlán. Large quantities of mica have been recovered from Monte Albán, especially on the North Platform (Rosales de la Rosa 2021, 241; Winter et al. 2002, 632–33). Although

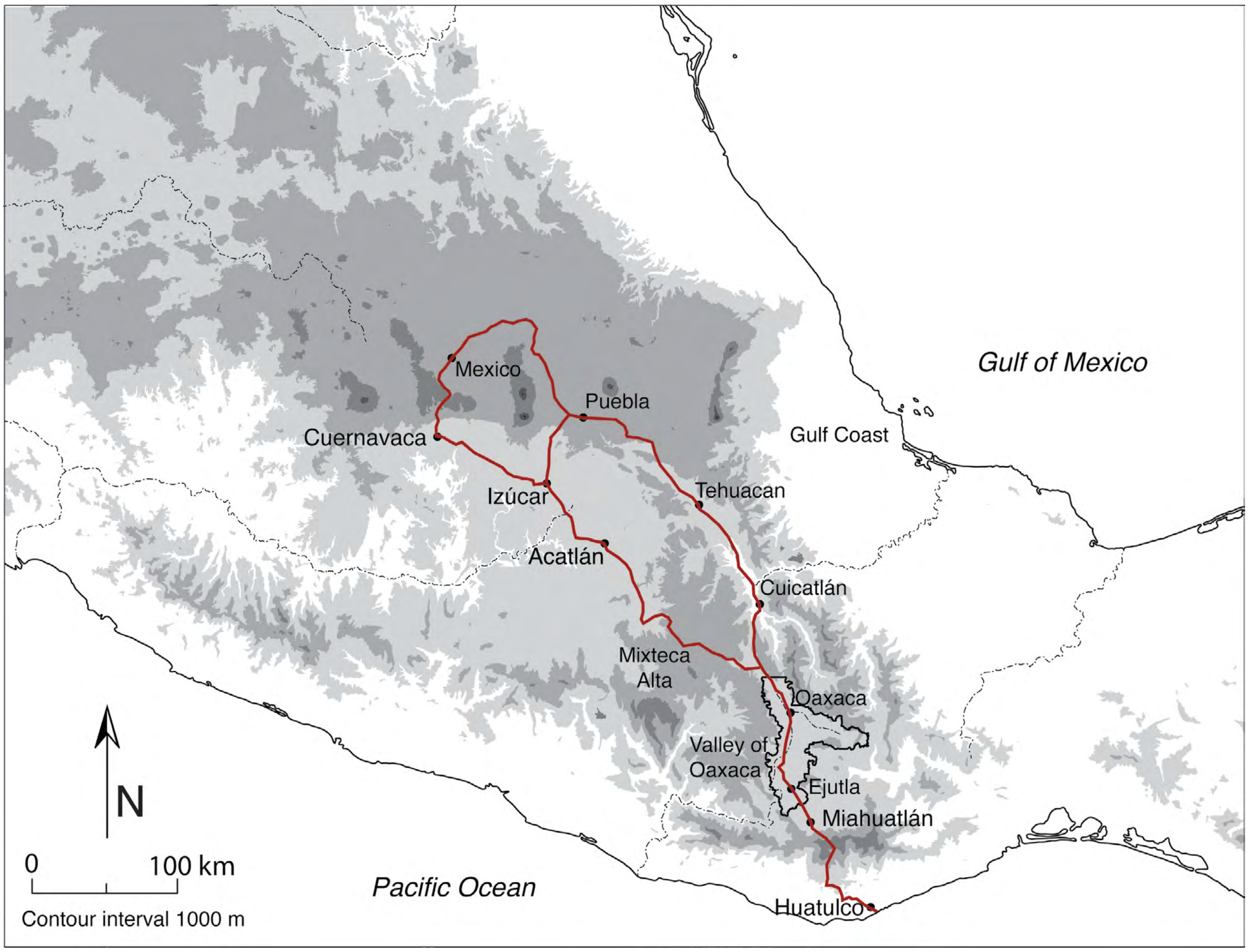

Figure 8.41. Map of colonial route from the Pacific Coast to Central Mexico (route from Borah 1954, 27) that passes through Miahuatlán, Ejutla, and the center of the Valley of Oaxaca.

there are no mica sources near Teotihuacan, mica has also been recovered from multiple residential compounds at that city, but especially dense concentrations were uncovered at the Xalla palace, where it was crafted into lapidary objects (Manzanilla 2017; Manzanilla et al. 2017; Rosales de la Rosa 2019, 2021). To determine the source of the mica, Linda Manzanilla and her team (Manzanilla et al. 2017, 2019) used neutron activation to analyze 18 archaeological samples, mostly from Teotihuacan and the North Platform at Monte Albán, and 9 mines, all from Oaxaca, including 2 from near Monte Albán and 4 from Ejutla. The composition of all of the archaeological pieces from both Teotihuacan and Monte Albán matched the samples from several mines in Ejutla (Figure 8.42). Although the analytical sample is small and more testing is needed, none of the archaeological mica came from the other mines in Oaxaca, including those near Monte Albán. And one sheet of cut mica from Teotihuacan (Manzanilla et al. 2017, figure 7) closely resembles one of the pieces of mica in the pit in the floor of the excavated house in Ejutla (see chapter 9). Although no archaeological pieces from the Ejutla site were analyzed in this study, the majority of pieces from the excavations were biotite mica, likely from the same mine (M11) that was included in the neutron activation analysis (Manzanilla et al. 2017, 25). A plausible scenario is that the mica was exchanged through networks that brought it from Ejutla to Monte Albán and then on to Teotihuacan, along with other goods, such as Pacific Coast shell.

With mica from mines in Ejutla documented on the North Platform of Monte Albán, and West Mexican obsidian likely reaching Monte Albán along similar networks that passed through Ejutla, it seems likely that at least some Pacific Coast shell, worked and unworked, also reached Monte Albán through Ejutla. Ejutla is located on several principal trade routes along which Pacific Coast shell and other coastal goods moved into the highlands. Whether shell from Ejutla might have been minimally processed, blanks, or finished ornaments is unknown, but there is nothing about the shell assemblage at Monte Albán, either the kinds of ornaments or how they were made, that precludes those possibilities. Of course, obsidian from other sources reached Monte Albán through different networks, as did shell from the Atlantic, and we have never suggested that all shell at Monte Albán came from Ejutla (contra Melgar Tísoc et al. 2010, 2018), only that we cannot rule out that Monte Albán obtained some shell from Ejutla (see Feinman and Nicholas 1995c, 2000).

During the Classic period, there was a considerable volume of coastal-to-highland marine shell exchange (e.g., Kolb 1987). Worked shell was abundant in the 'Oaxaca barrio' at Teotihuacan (Millon 1981, 227; Starbuck 1975, 150), where the predominant species was *Chama echinata*, a key species at both Ejutla and Monte Albán that apparently was less abundant elsewhere at Teotihuacan (Starbuck 1975, 150–51). Since mica from mines in Ejutla made its way to Monte Albán and then Teotihuacan, it also is not a stretch that some Pacific Coast shell also reached the Central Mexican metropolis along the same route. As Borah (1954) noted, the route from the coast through Ejutla and the Central Valleys of Oaxaca on to Teotihuacan was the easiest, if not the shortest, route from the Pacific Coast to Central Mexico (see also Carballo 2013).

Given the preponderance of evidence for domestic production in Oaxaca (e.g., Feinman 1999; Feinman and Nicholas 2000, 2004a, 2012), production and distribution could not have been easily controlled by central authorities, and producers and consumers likely engaged in other mechanisms of transfer, like marketplace exchange (see chapter 6; e.g., Feinman and Nicholas 2010, 2012; contra

Figure 8.42. A mica mine in Ejutla.

Melgar Tísoc et al. 2010, 2018). Markets appear to have been established early in the history of Monte Albán (Feinman et al. 1984; Nicholas and Feinman 2022), with goods arriving in the city from near and far (Nicholas et al. 2022). As illustrated, one of the least-cost routes to Monte Albán and the center of the valley from the Pacific Coast was through Ejutla. The Ejutla shell workers were among the only craft specialists in the valley who engaged in the high-intensity crafting of shell ornaments (bulk luxuries) for exchange, so it is likely that at least some Pacific Coast shell that passed through or was worked into ornaments in Ejutla reached Monte Albán along with mica from the Ejutla district and Ucareo obsidian that arrived in the Central Valleys of Oaxaca from the south along with Pacific Coast shell. The mica, and possibly some Pacific Coast shells, eventually could have reached Teotihuacan in Central Mexico. Specialized production in a domestic context was linked into exchange and transfer networks that traversed the western half of the prehispanic Mesoamerican world (Blanton and Feinman 1984).

9

Lapidary, Bone, and Tools of Production

Shell working and ceramic production were the principal, but not the only, craftwork activities of the Ejutla household. They were not even the only kinds of specialized economic production, as lapidary work also appears to have been carried out for exchange. Although the members of the excavated household produced shell ornaments and certain ceramic products at fairly high levels of intensity for exchange beyond their immediate household or community, they made lapidary items seemingly at lower frequency and intensity. Dog teeth, and some bone, were also modified, possibly for inclusion in neckwear with beads of shell. In addition, they made bone tools, spun fiber, and wove cloth. But these latter production activities were likely mostly or entirely for the consumption of this household.

In this chapter, we focus on these other secondary crafts and practices along with the tools of production. We start with the evidence for lapidary craftwork and the evidence of cross-craft technology (Shimada 1996, 2007). Specifically, we discuss hollow tubular cane drills that were used to shape both shell and stone materials. We follow with a consideration of the worked bone, including ornaments as well as tools that have been employed for weaving (Feinman et al. 2018b). We close the chapter with a discussion of the stone tools that the Ejutla artisans made to work the shell and lapidary materials. Some of these tools are discussed and depicted in chapter 5, as their use cannot be tied solely to craftwork, and they were likely used for other domestic tasks as well, including agricultural activities. Here we focus on their use for working lapidary stone and shell. Other tools are mentioned in section 8.4 in conjunction with shell-working techniques. In section 9.3 we provide additional information on the tools themselves.

9.1. Lapidary Craftwork

Among recovered artifacts in the middens and the house are numerous stone ornaments, unfinished lapidary objects, small carved stones, and semiprecious raw materials and production debris, including flakes of greenstone, mica, and large quartz crystals (Table 9.1). One of the most abundant lapidary objects are cylindrical drill cores or plugs. Most of these small cylinders are onyx, although a few are limestone or unidentified stone (Figure 9.1). The drill cores are generally between 1 and 3 cm long, with diameters of 10–12 mm. They were cut with a hollow tubular drill (Foshag 1957, 54–55; Holmes 1919, 350–51; Rau 1869, 393) made from cane, applying the same tools and technology that was used to obtain shell disks. The diameters of the drill plugs match those of the shell disks that were cut with tubular drills (Figure 9.2). Some plugs still have the characteristic lip at their base, while the base of others is rough and unsmoothed. The tops of several drill cores bear tubular cut marks showing where a prior level of drill cores had been removed; others have one concave side showing where an adjacent plug had previously been removed. None of the drill plugs were worked into ornaments but instead are the remnants from using tubular cane drills to hollow out stone blocks into rounded bowls (e.g., Diehl 1983, 101–02). There are no complete (or even partially complete) finished stone bowls in the assemblage of any size, only eight very small fragments that most likely represent failed attempts. Most of them were cut from the same material as the recovered drill plugs. One tiny piece of onyx microdebitage was recovered from the house floor, tying the working of onyx to the Ejutla household (Feinman et al. 1993, 38; Middleton 1998, 213–14). This use of 'intersecting technologies' (Earle 1994, 455; Hagstrum 1992) to produce very different items further supports the inference that this Ejutla household was involved in several craft activities, or 'multicrafting.'

Most of the drill plugs were found in the dense midden or near the house, but 10 were collected from the surface in the area south of the excavated house, in the same area where there was dense shell debris and other possible houses. We suspect multicrafting was practiced by many households in this part of the Ejutla site, but the proportion of their time devoted to different crafts and the levels of intensity at which they worked likely varied from the house we excavated.

Other objects of onyx include flat, mostly rectangular plaques, flakes, and chunks of unworked material (Figure 9.3). Several plaques have at least one nicely cut edge, but only one of them appears to have been finished into an ornament. This ornament has a trapezoidal form, with all four edges smoothly abraded. One top corner is broken; the other corner has a small carved notch on the top and another longer one on the side just below the top, possibly to hold string for suspension. The possible pendant is approximately 4 cm long. The nearly complete scarcity of other onyx ornaments compared to debris is similar to the pattern for shell, with much more debris than finished or partly finished artifacts, indicating these ornaments also may have been made for exchange and thereby had been transferred from this context.

Semiprecious stones in the Ejutla assemblage include beads and larger unworked chunks of greenstone and other nonlocal material (Figure 9.4). Most of the beads

Table 9.1. Lapidary objects and materials at Ejutla.

Stone material*	Bowl	Drill core	Natural crystal	Lapidary fragment	Lapidary object	Ornament	Pebble	Debitage	Raw material	Total
andesite	1	–	–	–	–	–	–	–	–	1
basalt	–	–	–	1	–	–	–	–	–	1
chert	1	–	–	–	–	2	–	–	1	4
crystals	–	–	103	34	4	–	3	–	3	147
greenstone	–	–	–	–	1	11	–	8	2	22
gypsum	–	–	–	5	–	–	–	–	–	5
ignimbrite/tuff	–	–	–	–	–	2	–	–	–	2
limestone	1	3	–	–	4	2	–	–	–	10
limonite	–	–	–	–	–	1	–	–	–	1
mica	–	–	–	–	–	1	–	–	190	191
mudstone	–	1	–	–	–	1	–	–	–	2
obsidian	–	–	–	–	–	14	–	–	–	14
onyx	3	35	–	6	8	–	–	9	6	67
other semiprecious	–	–	–	–	–	–	–	–	8	8
quartz	1	1	–	–	–	3	–	–	–	5
sandstone	1		–	–	–	1	–	–	–	2
schist	–	–	–	–	–	–	–	–	1	1
slate	–	–	–	–	1	–	–	–	–	1
UID stone	–	2	–	–	–	2	–	–	–	5
Total	8	42	103	46	18	40	3	17	211	489

* does not include tools.

Figure 9.1. Cylindrical drill plugs cut from onyx, limestone, and other unidentified stone.

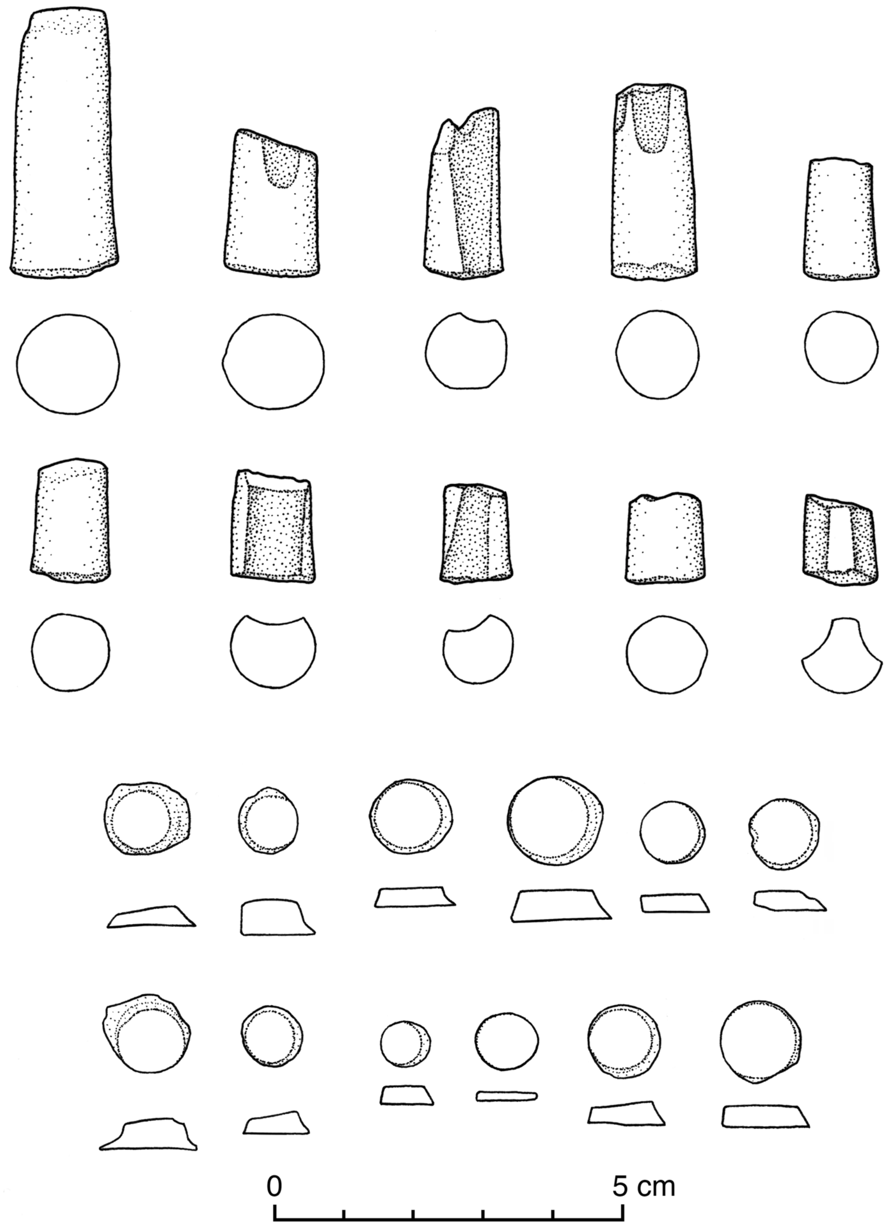

Figure 9.2. Drawings of stone drill plugs (top 2 rows) and shell disks (bottom 2 rows) cut with hollow tubular drills.

are greenstone or were crafted from the same materials as the drill plugs and bowl fragments. Although the overall number of greenstone ornaments and the amount of debris are low, flecks of greenstone in the microdebitage collected from the house floor also tie the crafting of the greenstone ornaments to the house (Middleton 1998, 213). As with the shell ornaments and onyx plaques, we have no way to determine how many finished objects may have been crafted and traded away.

Although most spindle whorls and whistles are ceramic, one whorl was made of stone, and a small buccal whistle was made of ignimbrite (see Figure 9.4 bottom). The whistle has a groove in the top edge and a hole drilled through the groove from both sides (e.g., Sánchez Santiago 2014). Other lapidary material at Ejutla includes several small human heads that may be unfinished pendants or other adornments—none were perforated for suspension (Figure 9.5).

Large carved objects are rare but include a stone with carved bird imagery on two sides that was located just outside the north room of the structure (Figure 9.6). The stone appears to be a fragment from a larger object of unknown provenience. It was likely brought to the house already broken and placed near the entryway to the north room (see Figures 4.2 and 4.9). This object with bird imagery is dissimilar to any other stone used in the construction of the house and was originally carved elsewhere.

In the north room of the house there was small cache in the floor with numerous large cut pieces of mica (see Figure 4.10, Figure 9.7). We also recovered hundreds of thin mica sheets, mostly in and around the house (119

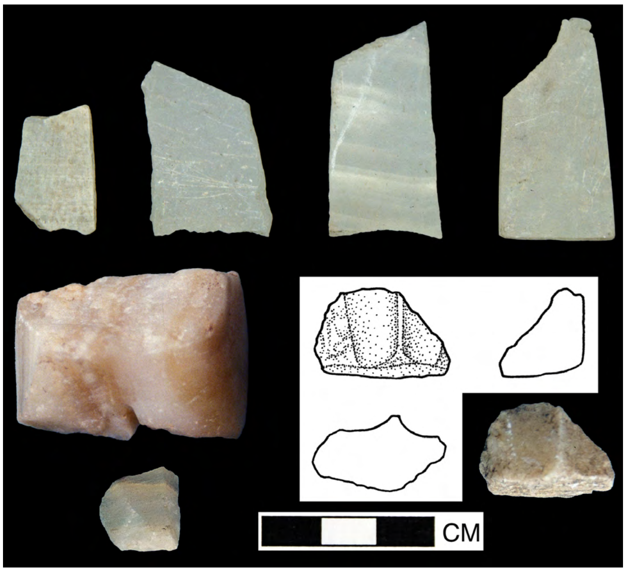

Figure 9.3. Onyx plaques, including possible broken ornament (on right top), and other onyx cut pieces.

Figure 9.4. Small lapidary objects include beads (top), obsidian nose plugs (center), a spindle whorl (bottom left), and a buccal whistle (bottom right).

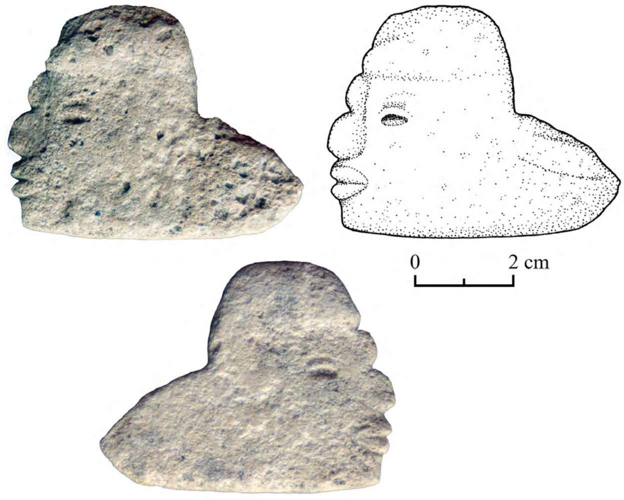

Figure 9.5. Small carved stone head in profile.

out of 191 collected pieces) but also some in the midden. Like microdebitage, small thin sheets of mica may not have been removed during floor sweeping. The mica may have been fashioned into ornamental pieces but also used as temper in pottery. Mica sheets were rare finds during our excavations at other Classic period sites, especially El Palmillo and the Mitla Fortress. The much greater abundance of mica at Ejutla reflects the role of the site's domestic units in exchange networks that brought mica from the Ejutla Valley to Monte Albán and as far north as Teotihuacan (see section 8.7).

Another semiprecious material that was abundant in Ejutla and rare at the other sites we excavated is crystal (n = 153 pieces) (Table 9.2). Crystals were considered a precious stone in prehispanic Mesoamerica (Brady and Prufer 1999; Sahagún 1963 [1590], 222, 225, 229) that was crafted into items of personal adornment (Brady and Prufer 1999; Sahagún 1959 [1590], 8, 18, 80; Smith and Kidder 1951, 44). A crystal earspool in the Museum of the American Indian is reported to be from Ejutla (Kidder 1947, 53). Approximately two-thirds of the rock crystal at Ejutla are natural quartz crystals; other pieces had been cut or otherwise modified, including one that was worked into a microdrill. Across Mesoamerica rock crystals have most often been found in ritual caches and offerings (Brady and Prufer 1999), but this is not the case in Ejutla. Although how the natural crystals were used at Ejutla is unknown, rock crystals have a hardness of 7 on the Mohs scale (Foreman 1978, 18), and the natural crystals also may have been used to work or polish beads made of shell or other materials.

In addition to the flecks of shell, onyx, and greenstone, tiny flakes of chert, mica, obsidian, and basalt were also recovered in microdebitage samples from the house floor (Middleton 1998, 213–14). Given the high quantity of obsidian blades in the Ejutla assemblage and the lack of cores, the blades were arriving in Ejutla already formed,

Figure 9.6. Carved stone with bird imagery found just outside the eastern wall of the structure.

and the flecks come from the resharpening of dulled blades, the working of blades into microdrills and other small tools for perforating shell beads and pendants, and the crafting of small ornaments including nose plugs (see Figure 9.4 center).

By weight and quantity (per liter of soil), the density of all the microartifacts generally exceeds the figures reported by Widmer (1991; see also Widmer 2019) for a suggested lapidary and shell-working area at Teotihuacan (Feinman et al. 1993). The recovery of these microartifacts in the heavy fraction from floor deposits provides support for the working of these materials inside the excavated house (Feinman et al. 1993; Middleton 1998, 213–14). Although larger artifacts of most of these materials are not particularly abundant in the collections associated specifically with the structure, all were found in the nearby dense midden. For comparison, similar samples taken from a deposit associated with ceramic firing contained many small fired concretions and a greater quantity of small bone fragments than were found within the house, but only a single obsidian flake and no shell (Feinman et al. 1993, 38–39).

9.2. Bone Working

We recovered a range of bone tools, ornaments, and worked bone debris at Ejutla, made from both human and other animal remains that are present in the faunal assemblage. Given the availability of the raw materials, the widespread occurrence of most of the same basic tool forms at El Palmillo, Lambityeco, and the Mitla Fortress, and the limited quantities of worked bone debris, the tools and ornaments recovered in this Ejutla house appear to

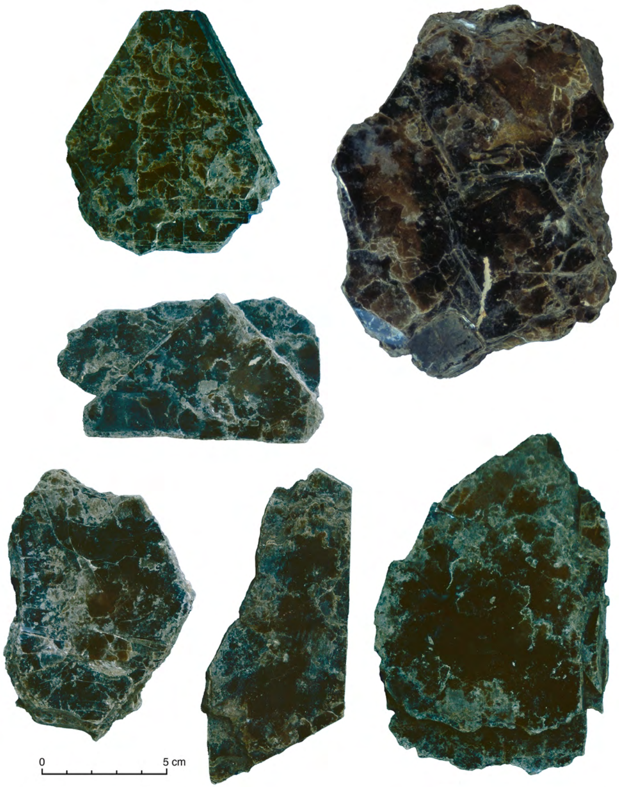

Figure 9.7. Thick sheets of mica from a cache in the north room of the structure.

have been made on site for use in other crafts or activities, and most were not produced for exchange (Feinman and Nicholas 2004a, 2007a; Feinman et al. 2018b).

The most common bone tool forms at the four Classic period sites correspond to general descriptors employed at other Mesoamerican sites—awls, perforators, needles, battens, pressure flakers, and disks (Feinman et al. 2018b; Middleton et al. 2002; see also Coe 1959; Kidder 1947; Kidder et al. 1946; MacNeish et al. 1967; Willey 1972; Table 9.3). The quantities and proportions of specific tool forms in each domestic assemblage we excavated vary by site and even household, indicating that distinct sets of activities were carried out to different degrees in individual houses (Feinman and Nicholas 2012; Feinman et al. 2018b, 55–57, table 5). At Ejutla, the two most abundant bone tools are awls and needles (Figure 9.8 center and top, respectively, Table 9.4). The awls were made principally of deer or human bone (or unidentified large mammal), while the taxa of the needles could not be determined. Battens and perforators are present in low numbers (Figure 9.8 bottom left); we also found one pressure flaker made from deer antler and one shuttle (for weaving) (bottom right).

Although some bone tools, especially awls but also perforators, are multipurpose implements used for a variety of tasks (Feinman et al. 2018b), most of the tools have been linked to elements of fiber working and textile production (e.g., Chase et al. 2008; Feinman and Nicholas 2004a; Halperin 2008; Manzanilla 2006; Middleton et al. 2002; Pohl 1994), for which we have evidence from other tools, such as stone raspadors for processing maguey fronds to extract fibers (Hester and Heizer 1972) and ceramic spindle whorls. Whereas raspadors are few at Ejutla, there are many small ceramic spindle whorls (and one of stone, see Figure 9.4 bottom left) that were likely used to spin lightweight fibers, such as cotton or fine maguey. Some of the formal spindle whorls made on site (see chapter 7) may have been traded to neighboring communities, but the presence of tools like battens, needles, and the shuttle indicate that at least some members of the excavated house also engaged occasionally in spinning and weaving. It may have been possible to grow cotton in the Ejutla Valley in areas where the water table was high, such as along the Atoyac River in southern Ejutla (Feinman and

Table 9.2. Comparison of select stone materials and tools at four Classic period sites.

Object/material	Ejutla	El Palmillo	Mitla Fortress	Lambityeco
onyx/marble	67	32	2	7
greenstone	27	41	5	6
crystals	153	62	–	18
mica	191	4	5	29
chert microdrills	169	1	–	–
other microdrills	10	–	–	–
total perforators	431	90	6	20
onyx drill core	35	–	–	–
other drill core	6	–	–	–
onyx plaque/whistle	8	–	2	–
onyx bowl	3	–	–	–
other stone bowl	5	–	–	–

Table 9.3. Principal bone tool categories in Classic period Oaxaca.

Category	Description
Awl	Long, sturdy tool with one broad end that tapers to a well-defined point or more rounded, blunt tip. Typically crafted on a large mammal long bone, often a deer metapodial. Often fire-hardened to increase durability. Divided into two groups based on size.
Perforator	Long, slender tool with sharply pointed tip. Tool may be smoothly finished with circular cross section or crafted from flat section of bone with less finished edges.
Bloodletter	Long, slender tool that is similar in form to a perforator but is more finely made, more fragile, or comes to sharper point than most perforators. May be highly polished or decorated, often found in special contexts. Includes shark teeth and sharpened animal teeth.
Needle	Long, slender, straight tool with a pointed tip and an eye for stringing on the opposite end. All edges smoothed. Has circular or slightly flattened cross section.
Batten	Long, wide, and relatively flat tool with smoothed edges and blunt tapered ends. Typically made from a mammal long bone, often a tibia.
Disk/spindle whorl	Slightly curved circular implement with a central perforation. Typically crafted from cranial bone, most often human.
Shuttle	Slightly curved tool with smoothed edges and a perforation near one end. Typically crafted from shafts of long bone or rib.
Pressure flaker	Sturdy, solid tool with tapered tip that often has edge damage. Typically an antler tine. Frequently fire-hardened to increase durability.
Chisel	Triangular or wedge-shaped tool with one beveled end.

Figure 9.8. Bone tools include needles (top), awls (center and bottom left), shuttle (bottom right), and fire-hardened antler tip (above the shuttle).

Nicholas 2013, 118; see also Saindon 1977). The Ejutla region also was an entry point where lowland products like cotton entered the Central Valleys of Oaxaca (Ball and Brockington 1978).

The bone awls, deer antler pressure flaker, and perforators could have been used to work the shell. Bone and antler have a hardness similar to shell on the Mohs scale (Foreman 1978), and several of the awls and perforators had been burnt for hardening (Feinman et al. 2018b, 38, figure 2). The awls and antler would have been appropriate tools for roughly shaping beads by applying pressure or indirect percussion, and the perforators, used with abrasives and water, for drilling holes for suspension in neckwear (e.g., Foreman 1978).

The Ejutla craftworkers also worked bone into ornaments (see Table 9.4), including small beads, pendants (one is a perforated dog incisor), rings, and polished rectangles, or placas (Figure 9.9 top). Approximately half of the modified bone (38 of 86) was too fragmentary to determine form or function (Figure 9.9 bottom). Many are long bone fragments with polished surfaces and/or cut edges that could be unfinished or broken tools, including one burnt human long bone (Figure 9.9 center). Several turtle carapace fragments show clear working, including drilling and cut marks; a few of them may be unfinished, broken ornaments (Figure 9.10). But rather than crafting large numbers of bone ornaments from postcranial bone, the perforated dog tooth points to a potential source of raw material (similar to whole small gastropod shells) for making ornaments that only required perforation.

Dogs were the most abundant animal taxon at Ejutla (both MNI and NISP) (see chapter 5), raised principally as a high-quality food source. Yet the dog remains at Ejutla are heavily overrepresented by cranial units, almost entirely due to loose teeth, particularly canines. In a natural

Table 9.4. Worked bone by taxon at Ejutla.

Category	Bird UID	White-tailed deer	Domestic dog	Human	Turkey	Turtle	UID	UID large	Total
Ornament	**–**	**–**	**3**	**–**	**–**	**1**	**7**	**3**	**14**
bead	–	–	2	–	–	–	1	–	3
bead blank	–	–	–	–	–	–	3	–	3
pendant	–	–	1	–	–	1	–	–	2
polished rectangle	–	–	–	–	–	–	1	2	3
ring	–	–	–	–	–	–	2	–	2
smoothed rectangle	–	–	–	–	–	–	–	1	1
Tool	**–**	**4**	**–**	**1**	**1**	**1**	**14**	**5**	**25**
awl	–	3	–	1	1	–	3	2	10
batten	–	–	–	–	–	–	1	1	2
needle	–	–	–	–	–	–	7	–	7
needle/perforator	–	–	–	–	–	–	1	–	1
perforator	–	–	–	–	–	–	2	1	3
antler pressure flaker	–	1	–	–	–	–	–	–	1
shuttle/batten	–	–	–	–	–	–	–	1	1
Worked bone	**1**	**1**	**3**	**1**	**1**	**4**	**22**	**13**	**38**
abraded	–	–	–	1	–	–	–	–	1
beveled edge	–	–	–	–	–	–	–	1	1
cut marks	1	1	3	–	1	3	8	11	28
comb	–	–	–	–	–	1	–	–	1
drilled	–	–	–	–	–	–	1	–	1
engraved	–	–	–	–	–	1	–	–	1
grooved	–	–	–	–	–	–	1	–	1
modified	–	–	–	–	–	–	–	1	1
polished	–	–	–	–	–	–	4	–	4
unknown	–	–	–	–	–	–	8	–	8
Total	**1**	**5**	**6**	**2**	**2**	**6**	**43**	**21**	**86**

Figure 9.9. Bone ornaments on the top row (left to right) include perforated dog incisor, bone ring, bone plaque, and polished bone fragments. Rest of bone, including human long bone, has cut marks and other evidence of working.

Figure 9.10. Cut and worked turtle shells.

assemblage 9.5% of a dog's teeth would be canines, but at Ejutla they are 34% of all loose teeth (Middleton et al. 2002, 241). No other taxon at Ejutla shows this pattern, so clearly something unusual was happening with dog canines. It seems likely that the high number of dog teeth associated with the Ejutla household does not reflect subsistence activities alone but resulted from other uses of dog remains.

There are a number of possible explanations for the abundance of loose dog teeth at Ejutla. One possibility is that, because teeth are highly durable, they are the skeletal part that is most often preserved after weather, traffic, and scavengers have destroyed most other skeletal units or reduced them to unidentifiable fragments (e.g., Hamblin 1984, 114). But no other taxon at Ejutla exhibits such an overrepresentation of loose teeth. Another possible explanation is that dog teeth are sufficiently large to be consistently recovered by screening, yet deer teeth, even larger, are underrepresented relative to other elements, and jackrabbits, with smaller teeth, are evenly represented (Middleton et al. 2002, 242). A third possibility is that dog teeth, especially canines, were preferentially collected and curated by the members of this household. We also recovered loose dog canines in quantities three to four times higher than they naturally occur in a dog's dentition at El Palmillo, Lambityeco, and the Mitla Fortress (Feinman et al. 2018b, 54), a pattern previously noted by Hamblin (1984, 114) at the Maya site of Cozumel, where she recovered several perforated canines. Widespread curation of dog canines implies that dogs had an importance beyond their use as a source of meat (Hamblin 1984; Pohl and Feldman 1982).

Perforated dog canines are not uncommon ornaments and have been found at sites across Mesoamerica (e.g., Ekholm 1944, 484; Garber 1989, 53, figure 17; Hamblin 1984, 114; Kidder 1947, 57, figure 81a; Moholy-Nagy 2008, 73, figure 213a and 1b; Pollock et al. 1962, figure 41h; Willey 1972, 239, figure 201a and b; 1978, 171, figures 169j and 171 right; Willey et al. 1994), including more than 95 canines from a tomb at Kaminaljuyu in Guatemala (Kidder et al. 1946, 155, figure 161e), in which the canines had likely been strung into a necklace. Low numbers of perforated dog canines have also been found in Oaxaca, at Formative period sites (Drennan 1976, figure 73; Flannery and Marcus 2005, 216, figure 10.2g, 383; Joyce 1991, 759) and at other excavated Classic period sites—El Palmillo, the Mitla Fortress, and Lambityeco (Feinman et al. 2018b, 52–54, figure 13l–o).

Yet at Ejutla, dog teeth, especially canines, are a larger proportion of all dog remains than at the other sites, and we suspect they were curated as unfinished ornaments that were intended to be strung into necklaces with shell ornaments also made on site (Feinman et al. 2018b; Middleton et al. 2002). Across Mesoamerica perforated animal teeth were strung in this manner with other ornaments, including shell and bone beads and even human teeth (e.g., Garber 1989, 53; Kidder 1947, 57; Pollock et al. 1962, figure 41a–i; Thompson 1939, 179–80). Tooth-shaped ornaments have also been carved from a variety of materials, particularly shell (e.g., Coe 1959, 58, figure 52b; Ekholm 1942, 109, figure 21f; Siliceo Pauer 1925, 210–11).

The perforated dog tooth at Ejutla is an incisor (see Figure 9.9, top left); both canines and incisors perforated for suspension have been found elsewhere, including in burials in Central Mexico, where they were strung together on a necklace (e.g., Vaillant 1931, 314). This low ratio of finished ornaments to unfinished ornaments or raw material at Ejutla is similar to the recovery rate for complete versus in-process marine shell ornaments (see chapter 8; Feinman and Nicholas 1993, 1995c, 2000). Such ratios are not unexpected in a production context for exchange. Undoubtedly the loose teeth originated as food waste, but they—especially the canines and incisors—were likely curated and/or acquired for ornament production.

9.3. Tools of Production at Ejutla

The stone assemblage at Ejutla comprises many of the tools that have been identified as effective for working shell into ornaments (chapters 5 and 8); they have also been proposed to have a role in lapidary work (e.g., Melgar Tísoc et al. 2010, 2018). In the Ejutla stone assemblage, tools of obsidian, basalt, chert, and quartz parallel in form stone tools described elsewhere in Mesoamerica as having been used to work shell or for lapidary tasks. Tools of these four stone materials are abundant at Ejutla, especially obsidian blades. Implements of obsidian undoubtedly were used for many varied tasks. But the patterns at Ejutla contrast with those noted at El Palmillo, Lambityeco, and the Mitla Fortress in several ways. These differences extend to other stone materials as well and offer support for our supposition that stone tools of all of these materials were used at Ejutla to work the shell (Table 9.5).

Obsidian blades are a common tool in most Classic period stone assemblages in Oaxaca, yet the quantity of blades used by the residents of this one house in Ejutla far surpasses the number of blades associated with any one residence we excavated at El Palmillo, the Mitla Fortress, or Lambityeco, even the more elaborate residences, and the abundant blades at Ejutla may have been procured, at least in part, to work the shell (Feinman et al. 2013, 2018c; Nicholas et al. 2022; see also Martínez López and Markens 2004; Melgar Tísoc et al. 2010, 2018). Given the very low number of cores (12 from 4 different obsidian sources), most of the obsidian arrived in this house as blades (see Table 5.5). Whether the blades were knapped from the core elsewhere at the Ejutla site or before the obsidian reached Ejutla remains a question. Most obsidian blades in Ejutla were especially heavily worn down from cutting another hard material, like shell (see Lewenstein 1987) (Figure 9.11), and much of the obsidian microdebitage in and around the house likely came from repeated resharpenings of the worn blades. In general, the obsidian blades from Ejutla tend to be more heavily worn and used than the obsidian recovered at the other three sites where we excavated.

In contrast to the obsidian, the assemblages of chert and basalt at Ejutla are dominated by high amounts of reduction debris from the manufacture of tools. Given the high amounts of reduction debris around the house and in the midden, the householders worked local chert into a variety of flaked tools, bifaces, perforators, and microdrills, and they made abraders, grinding tools, and large flaked tools from basalt, as well as a variety of other

Table 9.5. Comparison of counts and weights of four principal stone materials at Ejutla and three other Classic period sites.

Material count and weight	Ejutla (1 house)	El Palmillo (8 houses)	Mitla Fortress (3 houses)	Lambityeco (1 house and plaza)
quartz	2735	125	3	20
obsidian	2819	3350	2305	1256
obsidian weight (kg)	1.22	1.65	1.44	0.60
chert	11188	51696	4129	508
chert weight (kg)	11.72	1505.38	100.48	8.72
basalt	6138	276	71	77
basalt weight (kg)	71.99	68.75	27.15	41.25
obsidian piece average weight (g)	0.43	0.49	0.62	0.48
chert piece average weight (g)	1.05	29.12	24.34	17.16

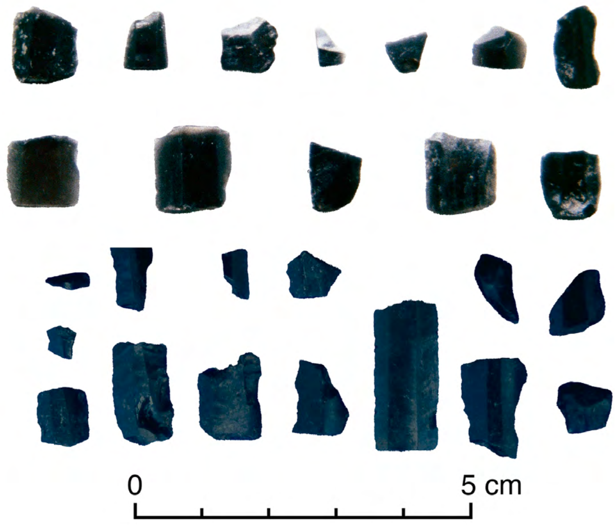

Figure 9.11. Heavily used small pieces of obsidian.

materials. The source of the basalt is unknown, but most of the chert came from a small but high-quality source at Cerro de las Huertas, 3 km east of Ejutla (Figure 9.12 top; Feinman and Nicholas 2000) or another source of translucent brown chert near Monte de Toro (Figure 9.12 bottom), approximately 15 km to the north. These tools appear to have been crafted for working shell or other materials and not for exchange (Feinman and Nicholas 1993, 1995c; Middleton 1998).

The chert and basalt assemblages at Ejutla are very different from those at El Palmillo, Lambityeco, and the Mitla Fortress. Chert is the most abundant stone material at Ejutla, El Palmillo, and the Mitla Fortress, and the quantity of pieces at Ejutla (not considering their size) is comparable to or greater than that for all residences at the other two sites. But the total weight of the material is much lower at Ejutla. For example, the average chert artifact at El Palmillo and the Mitla Fortress weigh 25–30 times more than at Ejutla (see Table 9.5). Although there is much less chert at Lambityeco than at Ejutla, the average piece weighs more than 17 times as much as the average chert artifact at Ejutla. This reflects the nature of the tools that were made and for what purpose but also the availability of different stone materials. Although there are many chert sources in the Tlacolula arm of the valley (Feinman and Nicholas 2004b; Parry 1987), including sources on site at El Palmillo and the Mitla Fortress, there are many fewer chert outcrops in Ejutla.

Utilized chert flakes and bifacially worked tools are common tools at all the sites, used for a variety of domestic tasks. At Ejutla they were also used to work shell. But the raspadors (mostly chert) that are abundant at sites in the dry Tlacolula arm of the valley—like El Palmillo (Feinman and Nicholas 2004a, 2012; Haines et al. 2004)—and were used to obtain fiber from maguey fronds are extremely rare at Ejutla. Alternatively, microdrills are abundant at Ejutla but are all but absent at the other sites. Most of the Ejutla microdrills, and many of the other small perforators, were made from fine translucent chert (from the Huertas source; see Figure 5.34), although several were made from obsidian, quartz, and crystal. Prodigious amounts of tiny chert chipping debris and microdebitage were created as the Ejutla artisans made, used, and resharpened the drills (Figure 9.13; Feinman and Nicholas 2011c, 36). The microdrills at Ejutla closely resemble microdrills that were used in many different world areas to perforate beads and pendants of various materials, including shell (e.g., Foreman 1978; Mester 1985, 107; Parry 1987; Piperno 1973; Yerkes 1983, figure 5; 1989, 115; 1993).

In contrast, basalt is not a common stone material at the three Tlacolula sites, where no residence has more than 70 pieces of basalt, compared to >6000 at Ejutla. Given the high quantities at Ejutla, the basalt was likely procured to make tools at least in part to work the shell. Basalt tools include grinding tools (manos, metates), axes, hammerstones, abraders, large perforators and gravers, and numerous large flakes with retouched or utilized edges (see Figure 5.35, Figure 5.36, Figure 5.37, Figure 5.38). Although these tool forms were also made from other raw materials, the dominant material was basalt. These tools are much larger than those made from chert; by count, there is almost twice as much chert as basalt at Ejutla, but the total weight of all basalt tools and debris is much greater (72 kg of basalt vs. 11.8 kg of chert).

The larger basalt tools would have been effective implements for the initial stages of breaking large shells into smaller pieces, while the abraders were used to shape the broken fragments into ornament blanks. We recovered hundreds of small pebbles, mostly of quartz, that were used for final polishing (see Figure 5.39), and also likely for burnishing ceramic vessels. The natural crystals would be effective polishers, although only two crystals are clearly modified or show clear evidence of such use. There also were many ceramic fragments with heavily abraded edges or scratched surfaces (Figure 9.14); these sherds were likely abraded as they were used in the final smoothing of cut shell and lapidary ornaments.

A final set of stone tools served as work platforms for processing shell or lapidary stone. The surfaces of three stones in the assemblage are marked by deep grooves (Figure 9.15); they are similar to grooved or incised tablets that are thought to have been used as abraders for final shaping and rounding of beads (Kozuch 2022, 69–70, figure 4; Masucci 1995, 76, figure 3). Other examples are flattened and bear abrasion lines and other indications that they were used as work platforms or drilling bases, including two repurposed ceramic fragments that were employed in this way (Figure 9.16). In sum, the stone tools at Ejutla that were used in crafting shell ornaments are part of an assemblage

Figure 9.12. Sources of gray translucent chert near Ejutla at Huertas (top) and Monte del Toro (bottom).

that differs in several key respects from the suite of stone tools that we recovered at the other Classic period sites. No evidence of shell working was found for the domestic units we excavated at El Palmillo, the Mitla Fortress, and Lambityeco.

9.4. Conclusions

The Ejutla craftworkers engaged in the high-intensity production of shell ornaments and ceramic figurines for exchange, but they did not do so to the exclusion of other craft activities. They also made lapidary objects and ornaments at a lower level of intensity, but nevertheless at least some of those objects also appear to have been made for exchange. The craftworkers imported the obsidian blades but made most of the other tools they used in their craft activities, including tools from animal and human bone that were intended more for local consumption. In other words, not only were they specialized domestic producers tied into widespread economic networks (both as producers and consumers), but they were multicrafters who did not engage full-time in any one crafting task. Clearly, the different elements of 'craft specialization' should be decoupled.

Figure 9.13. Chert production debris from making microdrills.

Figure 9.14. Repurposed ceramic sherds used as abraders.

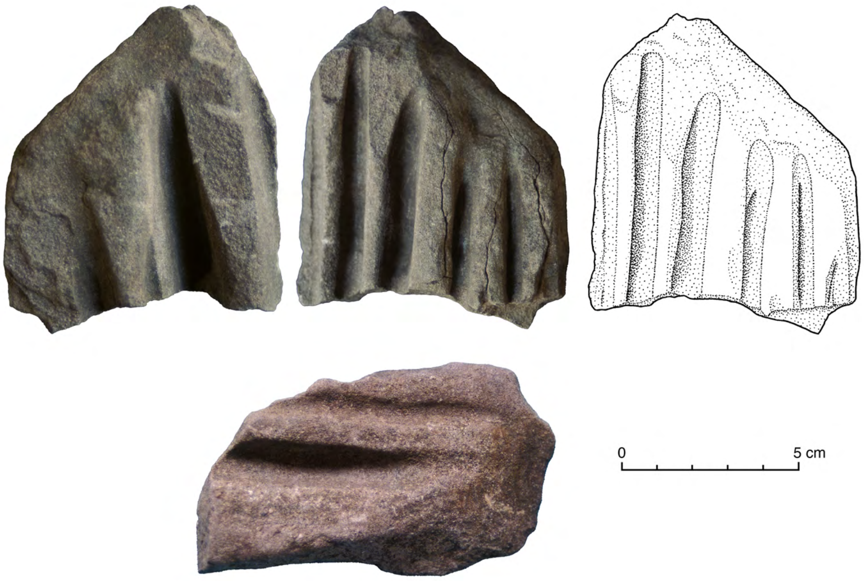

Figure 9.15. Stones with grooved lines; top photos are two sides of the same stone.

Figure 9.16. Stone platforms for working shell and lapidary and ceramic sherds with drill impressions (top right).

All the tools we documented for shell working could be used on more than one material once the skill was mastered. We know from the form of artifacts, the nature of cut marks and edges, and byproducts that some of these materials were perishable, like the hollow cane stalks that were fashioned into tubular drills (e.g., Caso 1965), both to extract small shell disks and to hollow out stone bowls. Cordage with abrasive and water could effectively cut shell, ornamental stone, and bone. The artisans made the small microdrills they used to perforate shell, stone, and bone beads and the basalt tools they used to initially break shell into smaller fragments for finishing into ornaments. Obsidian blades and flaked chert tools, of course, were not limited to cutting shell, but they were major parts of the tool kit for making ornaments of various materials. The abrading tools, stone platforms, and quartz polishing stones could be used with multiple materials. This multicrafting, or use of cross-craft technologies (Shimada 1996, 2007), was an important aspect of the high-intensity production at Ejutla.

10

Theoretical Implications and Concluding Thoughts

"Projects grow like organisms, with serendipity and supple adjustment, not like the foreordained steps of a high school proof in plane geometry."

(Stephen J. Gould 1985, 174)

Our interest in Ejutla began during the waning days of the Valley of Oaxaca Settlement Pattern Project in 1980, as we walked the path that formed the southern boundary of the project's survey area. This boundary was arbitrary, based on time and local permissions, and settlement did not drop off as we neared the border with the Ejutla district, to the south. We often thought about what might lie farther south and soon made plans to return to Oaxaca to extend the survey to include the Ejutla Valley (Feinman and Nicholas 1990, 2013), but we never imagined the anomalous quantities of cut marine shell, including broken ornaments, that we would find on the surface at the edge of Ejutla de Crespo, the contemporary district head town. Sites with massive accumulations of shell, places where that marine material seemingly was worked, are extremely rare in the landlocked Valley of Oaxaca, and finding even one piece of shell at a site during the survey was a rare event. So, in 1990, we set out to find why there was so much shell at the prehispanic site under the modern town of Ejutla de Crespo. Although, to start, we could not date the surface shell to a specific time period, the best-represented taxa were Pacific Coast varieties that were generally used for ornamentation rather than food in prehispanic Mesoamerica. This piqued our interest in interregional interaction between Ejutla and the Valley of Oaxaca and between Ejutla and the Pacific Coast.

We began the excavations at the Ejutla site with several basic questions in mind. When did the shell working occur? Most of the broken pottery on the surface could pertain to the Classic period, but ceramics from multiple periods (Monte Albán Late I–Monte Albán V, 300 BCE–1520 CE) were mixed with the shell debris and other artifacts. From where was the shell procured, and was it all from the Pacific Coast? What was the socioeconomic context of production? We had found dense surface shell over a large area at the eastern edge of the prehispanic site, so was this a ward of households whose occupants crafted shell into ornaments as Flannery and Marcus (2005, 66; Marcus 1989) argued for Formative period San José Mogote, or something else? Was this activity undertaken in a residential context, as indicated by surface debris that we observed mixed with the shell?

But the confirmation of shell ornament production at Ejutla was not all that awaited us. During the excavations we recovered thousands of pieces of cut and broken shell, but few complete ornaments, from a dense midden adjacent to a residential structure that was occupied during the Classic period (ca. 550–800 CE). Most of the shell was from the Pacific Coast, 100 km south of Ejutla over steep mountains. Chemical and microartifactual analysis of the floor helped tie the residents of the house to shell ornament production, but there were few ornaments in the house and only one small shell bead in the subfloor tomb. Given the huge quantities of cut shell debris in the midden and the rarity of finished shell ornaments in and near the house, we reasoned that the Ejutla shell workers crafted high volumes of ornaments for exchange and not for their own consumption.

The Ejutla craftworkers who fashioned shell into ornaments were specialists, in the sense that they produced for exchange or economic transfer. But they enacted their craft in a residential context. Clearly, they were not devoted full-time to this activity and engaged in multicrafting, including ceramic production, which we ultimately discovered and documented with more precise chronological control that it temporally proceeded shell ornament manufacture at least in the area we excavated.

The Ejutla multi-craftworkers also applied some of the same techniques and tools to produce lapidary objects, a process referred to as cross-craft technology (Shimada 1996, 2007). Around and under the excavated house there were at least five ash-filled pits, or pit kilns, and the amount of broken pottery we encountered during the excavations was overwhelming, including thousands of mold-made clay figurine fragments, hundreds of sherds with firing defects, and molds for making figurines and other ceramic forms. The figurines were not only made for the household but were consumed at other sites in the Ejutla Valley (Carpenter and Feinman 1999; Feinman 1999). In sum, the Ejutla artisans produced multiple crafts for exchange at a high level of intensity situated in a residential context. The practice of multiple craft production activities in association with domestic units (Feinman 1999; Feinman and Nicholas 2007a) has recently been more widely recognized in prehispanic Mesoamerica as well as in other premodern economies (Brumfiel and Nichols 2009; Hirth 2009a, 2009b, 2009c; Shimada 2007).

The new evidence from Ejutla on the nature of production and exchange in the Classic period economy of Oaxaca had revolutionary ramifications for how we think about Mesoamerican economies and even premodern economies more broadly. For the Ejutla craftworkers, the economy was not just local, as they engaged in the production of a range of goods for both regional and interregional exchange. They not only crafted figurines and spindle whorls for their own consumption but also traded them to other sites in the Ejutla Valley. Shell from the Pacific Coast reached Ejutla along travel routes that also extended farther north to central Oaxaca, bringing raw shell and likely finished ornaments from Ejutla to Monte Albán, the major consumer of shell ornaments in the Valley of Oaxaca during the Classic period. Routes of exchange extended all the way to Central Mexico, where mica from Ejutla reached Teotihuacan. Although several mica sources are present along the western edge of the Valley of Oaxaca, including near Monte Albán, an analysis of mica from Teotihuacan and Monte Albán sourced all the samples to mines in Ejutla (Manzanilla et al. 2017).

That craft specialization of both utilitarian and prestige goods was situated in a domestic context in Ejutla was counter to traditional models (e.g., Marx 1971) that uncritically extrapolated from recent histories of other global regions and presumed that most production in prehispanic Mesoamerican contexts would have been enacted in nondomestic workshops, which then could be centrally controlled through the hands of top-down governors or principals (Feinman 1999, Feinman and Nicholas 2000, 2012). Instead of this presumed yet entrenched model, the Ejutla research underpinned a wider realization that households were a key Mesoamerican institution (Kowalewski and Heredia 2020) that served as the primary unit of specialized production (e.g., Charlton et al. 1993; Feinman 1999; Hirth 2009b). This finding completely forces a reconsideration of how prehispanic Mesoamerican production, distribution, and consumption were organized and varied spatiotemporally, thereby raising doubts about long-held visions of premodern economies more generally (e.g., Blanton and Feinman 2024; Feinman 2017; Feinman and Garraty 2010; Feinman and Nicholas 2012).

Tied into economic and social networks, prehispanic Mesoamerican households were also tied into intermediate institutions, such as neighborhoods, that shared labor (Carballo et al. 2022). If hundreds or thousands of households in regions across prehispanic Mesoamerica produced goods for exchange, how could that production possibly be centrally administered or controlled? The realization that economic specialization in Mesoamerica was mostly centered in houses also raised fundamental questions about the distribution and consumption of craft products. Although markets, at grand scale, have long been recognized for the Aztecs, their perceived importance has been downplayed for earlier times (e.g., Cook 1968). The findings from Ejutla underpinned a key step in eclipsing the false market/no-market dichotomy (Wilk 1998, 469) for prehispanic Mesoamerican economies and premodern economies more generally (Feinman 2017; Feinman and Nicholas 2010). Many recent studies have compiled multiple lines of evidence to document the importance and diversity of precolonial Mesoamerican markets (e.g., Feinman and Garraty 2010; Garraty and Stark 2010; Masson and Freidel 2012; Shaw 2012) long before the Aztec empire.

During the excavations we arrived at answers for the queries that we began with, and more, but we still came away with additional questions that we could not answer based on what we discovered at Ejutla or even if we had continued at the site. We had found specialized production centered in houses for the Classic period in Oaxaca, just as it was during the Early Formative period in the region (Flannery and Winter 1976), and fully realized the importance of household archaeology. We wanted to excavate more houses. How representative were our findings from one house in Ejutla? Were other craft activities centered in residential contexts? The problem we faced was that it was difficult to find houses in the alluvial environment of Ejutla. We did not definitively identify the house that we excavated until the third season of excavation. There was no evidence of it on the surface. Other areas at the edge of the modern village were inaccessible. And testing in one area where surface remains were more visible revealed that all deposits had been plowed to high bedrock, completely destroying whatever prehispanic structure or other feature may have been there. Of course, at the time we were excavating in Ejutla, the surface geophysical technologies to detect subsurface features were not what they are today (e.g., Conyers 2023).

The aim to build and study a more robust sample of Classic period houses for Oaxaca led us to look for other sites where it would be possible to implement this research design. Many hilltop terrace sites had been mapped during the regional surveys, especially in the eastern, Tlacolula arm of the valley. They appeared to present our best opportunity. Residential architecture had been recorded on many terraces at these hilltop sites, often in conjunction with evidence of different craft activities. And many of these sites had not experienced the post-abandonment destruction of plowing and more recent constructions that have impacted many sites in more accessible, floodplain locations. Would we find specialized production in domestic settings? Would this production be for local consumption, for exchange, or for both, as in Ejutla? The two hilltop sites we chose to excavate are El Palmillo and the Mitla Fortress, where we excavated a total of 11 houses, all dating to the Classic period. For other reasons we were given the opportunity to excavate a third site in Tlacolula, Lambityeco, which has been in the literature since John Paddock's excavations there in the 1960s (e.g., Lind and Urcid 2010). Lambityeco is located on alluvial terrain in central Tlacolula, in an environment more similar to Ejutla than the hilltop sites, but because it is part of an archaeological zone, it was more protected, and we excavated one house and several other structures in the civic-ceremonial core of the site. Our excavations at these other sites expanded our knowledge about the Classic period economy of Oaxaca and, importantly, provided data to document both site and regional variation at the time that the Monte Albán polity was at its apex. At present, we plan future volumes that feature excavations at all three sites. Although our aim is to continue to focus these volumes on production and exchange, we will also examine other social and economic relations between households as well as the participation of householders in more overarching economic and political networks.

But to close, it is important to not lose sight of what we learned from the Ejutla excavations. We ascertained that specialized production for exchange in Oaxaca was carried out in domestic settings, that the goods produced were distributed beyond the house and the site, and that these findings have implications for our perspective on the Classic period economy in Oaxaca. We learned the importance of macroscale interactions and the interregional movement of goods. Ejutla during the Classic period was closely connected to the rest of the Valley of Oaxaca and the Pacific Coast, moving both shell and obsidian from West Mexico into the central valleys, and exchanging mica all the way to Teotihuacan in Central Mexico. And maybe most significantly, we learned the importance of looking at houses, as this smaller scale opens up lenses of variation for a given time and space. Household variation and the diverse socioeconomic connections between these domestic units make it blatantly clear that the past was neither homogeneous, static, nor elite-determined. Even those of modest means, often left out of written and documentary histories, played necessary roles and have key lessons to tell.

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Appendix 1

Calibrated and Modeled Radiocarbon Dates from Ejutla

Gary M. Feinman, Linda M. Nicholas, and Jennifer Birch

As we implemented our excavations at Ejutla, the Project Directors aimed to collect carbon samples from relevant contexts that could be used in conjunction with the ceramic collections to date the domestic architecture, the use of the pit features, and the specialized activities that were evidenced in our collections. We also wanted to document the occupational history of the excavated structure, and any activities that preceded its construction. The Ejutla carbon samples were collected opportunistically from a range of contexts where we judged there were sufficient quantities of charcoal to obtain a ^{14}C date. Of course, dating protocols and technologies in the early 1990s were not equivalent to the present. The collected carbon samples were not randomly placed and are heavily drawn from ashy deposits in the pit kilns and the dense midden that were adjacent to the structure. We collected scattered charcoal from below the house floor, but deposits associated with the house floor contained very little charcoal. Because of recent post-use disturbances, the uppermost levels of the prehispanic house were badly destroyed and not intact.

We obtained AMS results for 55 samples of charcoal (only one was a charred bean—UGAMS-59742) from Ejutla, 15 submitted to the University of Arizona Radiocarbon Facility in the 1990s and early 2000s and 40 submitted to the Center for Applied Isotope Studies at the University of Georgia (UGAMS) in 2022 and 2023. The samples run by the Georgia facility are part of a collaborative project to assemble a large database of carbon dates from across the Valley of Oaxaca for the entire prehispanic sequence (Kowalewski et al. n.d.). All samples in the database were calibrated by Jennifer Birch, using the most recent IntCal20 calibration (Reimer et al. 2020), and then Bayesian statistical modeling was applied to all samples in the database in an effort to examine the timing of transitional episodes at many different sites across the valley (e.g., Griffiths et al. 2023). The recalibrated dates and the corresponding modeled dates for the Ejutla carbon samples are listed in Table A1.1.

Bayesian modeling is a statistical approach to the interpretation of radiocarbon dates (Bayliss 2009; Buck

Table A1.1. Calibrated and modeled radiocarbon dates from the Ejutla excavations.

Lab number	Years BP	1 sigma	Δ13C	Excavation unit	Context	Unmodeled 68.3	Unmodeled 95.4	Modeled 68.3	Modeled 95.4
UGAMS-59732	1250	20	–25.5	20N24E	midden above pit kiln 4	688–820 CE	677–873 CE	700–749 CE	683–798 CE
UGAMS-59741	1190	20	–26.01	16N24E	midden above pit kiln 4	780–883 CE	773–890 CE	777–794 CE	714–815 CE
Arizona-AA21551	1235	50		18n24e	midden above pit kiln 4	689–877 CE	665–940 CE	692–785 CE	674–800 CE
UGAMS-59727	1180	20	–25.2	20N24E	midden above pit kiln 4	777–887 CE	772–944 CE	778–792 CE	772–806 CE
UGAMS-59728	1260	20	–27.06	20N24E	midden above pit kiln 4	685–744 CE	675–823 CE	691–750 CE	679–785 CE
UGAMS-59729	1100	20	–24.43	18N24E	midden above pit kiln 4	898–991 CE	892–994 CE	–	–
UGAMS-59733	1230	25	–26.33	20N24E	midden above pit kiln 4	707–874 CE	686–883 CE	706–796 CE	687–805 CE
UGAMS-59724	1050	20	–25.03	20N24E	midden above pit kiln 4	994–1021 CE	904-1029 CE	–	–
UGAMS-59725	1260	20	–26.39	22N22E	midden above pit kiln 4	685–744 CE	675–823 CE	691–750 CE	679–785 CE
UGAMS-59730	1180	20	–26.19	18N24E	midden above pit kiln 4	777–887 CE	772–944 CE	778–792 CE	771–807 CE
UGAMS-59736	1280	20	–24.34	20n26e	midden above pit kiln 4	680–770 CE	671–774 CE	685–774 CE	675–782 CE

(*Continued*)

Lab number	Years BP	1 sigma	Δ13C	Excavation unit	Context	Unmodeled 68.3	Unmodeled 95.4	Modeled 68.3	Modeled 95.4
UGAMS-59731	1430	20	–25.23	18N32E	midden above pit kiln 3	606–647 CE	600–652 CE	614–650 CE	598–677 CE
UGAMS-59734	1320	20	–25.11	18N32E	midden above pit kiln 3	661–772 CE	656–775 CE	664–773 CE	657–789 CE
UGAMS-59726	1290	20	–23.51	16N32E	midden above pit kiln 3	675–772 CE	667–774 CE	680–775 CE	670–784 CE
Arizona-AA50850	1458	46	–24	2n32e	house floor	580–645 CE	541–661 CE	605–650 CE	581–680 CE
Arizona-AA50854	1513	59	–26.4	4n36e	house floor	440–638 CE	430–645 CE	596–646 CE	576–676 CE
UGAMS-64474	1340	20	–27.55	4n36e	house floor	655–755 CE	650–773 CE	656–761 CE	651–782 CE
Arizona-AA50849	1297	48	–23	12n30e	midden above pit kiln 2	665–772 CE	650–873 CE	675–775 CE	658–789 CE
Arizona-AA27313	1415	55		8n32e	below floor	596–661 CE	546–772 CE	607–666 CE	585–773 CE
Arizona-AA50853	1332	39	–23.4	4n32e	below floor	654–772 CE	645–775 CE	658–774 CE	650–784 CE
Arizona-AA23387	1295	45		6n32e	below floor	667–772 CE	651–871 CE	676–775 CE	660–787 CE
Arizona-AA50855	1368	50	–25.4	8n30e	below floor	607–771 CE	594–775 CE	615–771 CE	604–780 CE
UGAMS-59749	1410	20	–27.1	2S36E	below floor	609–654 CE	605–657 CE	613–661 CE	603–683 CE
UGAMS-59750	1520	25	–23.97	2S34E	below floor	545–590 CE	439–605 CE	585–634 CE	571–665 CE
UGAMS-59751	1420	20	–26.89	2N38E	below floor	607–651 CE	601–655 CE	613–655 CE	601–682 CE
UGAMS-59753	1290	20	–26.17	4N38E	house floor	675–772 CE	667–774 CE	680–775 CE	670–784 CE
UGAMS-59754	1310	20	–23.98	4N38E	house floor	665–772 CE	658–775 CE	669–775 CE	662–787 CE
UGAMS-59755	1270	20	–23.71	6N34E	below floor	685–743 CE	670–798 CE	690–750 CE	677–783 CE
UGAMS-59756	1300	20	–24.28	8N30E	below floor	670–772 CE	662–775 CE	675–775 CE	666–784 CE
UGAMS-59735	1360	20	–25.57	18N32E	top of pit kiln 3	651–667 CE	643–758 CE	653–676 CE	644–765 CE
UGAMS-59737	1310	20	–27.43	18N24E	top of pit kiln 4	665–772 CE	658–775 CE	669–775 CE	662–787 CE
UGAMS-59738	1480	20	–22.94	18N24E	top of pit kiln 4	570–633 CE	561–641 CE	592–643 CE	577–668 CE
UGAMS-59739	1300	20	–27.3	18N24E	top of pit kiln 4	670–772 CE	662–775 CE	675–775 CE	666–784 CE
UGAMS-59744	1420	20	–25.43	18N34E	top of pit kiln 3	607–651 CE	601–655 CE	613–655 CE	601–682 CE
Arizona-AA21553	1440	50	–23.9	16n32e	top of pit kiln 3	591–651 CE	543–668 CE	606–656 CE	581–690 CE
Arizona-AA50851	1337	46	–25.3	14n30e	pit kiln 2	650–772 CE	606–777 CE	655–774 CE	618–790 CE
UGAMS-59746	1260	20	–25.27	14N30E	pit kiln 2	685–744 CE	675–823 CE	691–750 CE	679–785 CE
UGAMS-59747	1330	20	–23.39	14N30E	pit kiln 2	657–759 CE	652–774 CE	660–770 CE	654–786 CE
UGAMS-64473	1460	20	–25.01	14n30e	pit kiln 2	594–640 CE	574–645 CE	603–645 CE	585–672 CE

Lab number	Years BP	1 sigma	Δ13C	Excavation unit	Context	Unmodeled 68.3	Unmodeled 95.4	Modeled 68.3	Modeled 95.4
UGAMS-59748	1450	20	–24.76	14N30E	pit kiln 2	602–641 CE	583–649 CE	609–647 CE	590–674 CE
Arizona-AA21552	1370	50		16n32e	pit kiln 3	606–771 CE	591–775 CE	614–770 CE	603–780 CE
Arizona-AA50857	1414	39	-25.7	16n34e	pit kiln 3	605–655 CE	576–668 CE	612–660 CE	590–694 CE
UGAMS-59743	1290	20	-27.43	16N24E	pit kiln 4	675–772 CE	667–774 CE	680–775 CE	670–784 CE
Arizona-AA50856	1382	40	-24.1	18n24e	pit kiln 4	607–671 CE	594–773 CE	613–680 CE	600–776 CE
UGAMS-59740	1290	20	-23.44	18N24E	pit kiln 4	675–772 CE	667–774 CE	680–775 CE	670–784 CE
UGAMS-59742	1290	20	-22.09	18N26E	pit kiln 4	675–772 CE	667–774 CE	677–771 CE	667–774 CE
UGAMS-59745	1460	25	-27.16	14N36E	pit kiln 5	593–641 CE	571–647 CE	604–645 CE	583–673 CE
Arizona-AA50858	1424	50	-23.4	14n36e	pit kiln 5	598–655 CE	548–675 CE	608–660 CE	581–705 CE
UGAMS-59752	1430	20	-25.27	2N34E	pit kiln 1	606–647 CE	600–652 CE	614–650 CE	598–677 CE
UGAMS-59757	1420	20	-24.62	2N34E	pit kiln 1	607–651 CE	601–655 CE	612–655 CE	601–682 CE
UGAMS-64471	1480	20	-24.63	2n34e	pit kiln 1	570–633 CE	561–641 CE	592–642 CE	578–667 CE
UGAMS-64472	1440	20	-25.78	2n34e	pit kiln 1	605–642 CE	594–650 CE	610–649 CE	595–676 CE
Arizona-AA50852	1614	48	-23.4	2n34e	pit kiln 1	416–537 CE	266–567 CE	425–536 CE	363–576 CE
UGAMS-59758	1460	20	-24.62	2N34E	pit kiln 1	594–640 CE	574–645 CE	603–645 CE	585–671 CE
UGAMS-59759	1410	25	-24.1	0N34E	pit kiln 1	607–655 CE	601–660 CE	613–661 CE	601–687 CE

et al. 1991). The basic premise is that it permits the combination of radiocarbon measurements with prior information about archaeological context to obtain a more accurate and precise date estimate. Modeling here uses OxCal version 4.4 (Bronk Ramsey 2009)—the Oxcal runfile for Ejutla is listed below. Results are presented as a posterior probability distribution and a range of plausible dates that takes into account uncertainty in the results.

In chapter 4 of this text, we reference the calibrated carbon dates as relevant to different contexts and features. In general, the results from the Bayesian modeling parallel the basic occupational history that is discussed in chapter 4, which places the duration of the Ejutla domestic structure between the late 500s and 800 CE. The modeling tends to shorten the range of the calibrated dates at both ends of the sequence, ending the principal occupation by around 800 CE instead of possibly extending to ~900 CE and pushing forward the initial use of the pit kiln under the house by 100 years, from as early as 266 CE to 363 CE. In chapter 4, we present calibrated date ranges, noting where modeled dates significantly shorten the date range, most notably in the early pit kiln where only one sample (of several) returned an early calibrated date that matches the chronological assessment of the associated ceramics as well as the placement of this early firing feature below the domestic structure. Based on the range of dates from this feature, the principal investigators think that repeated firing in this pit kiln may have disturbed earlier firing events. Likewise, the upper extent of this early pit kiln was truncated by the construction of the residence, which included the placement of an earthen subfloor. Artifactual materials from the subfloor were mixed and included a sizable percentage of the Formative-era pottery recovered during this excavation.

Oxcal runfile

Dates UGAMS-59724 (1050,20) and UGAMS-57929 (1100,20) were removed as outliers in order to get an acceptable Agreement (was 59.2/50, now 106/106.1 [needs to be >60]).

```
Plot()
 {
  Outlier_Model("General",T(5),U(0,4),"t");
  Outlier_Model("Charcoal",Exp(1,-10,0),U(0,3),"t");
  Sequence()
  {
   Boundary("Start pit kiln 1 early");
   Phase("Pit kiln 1 early")
   {
    R_Date("AA-50852 charcoal pit kiln 1",1614,48)
    {
     Outlier("Charcoal",1);
    };
   };
   Boundary("End pit kiln 1 early");
   Boundary("Start Ejutla");
   Phase("Ejutla")
   {
    R_Date("AA-23387 charcoal",1295,45)
{
     Outlier("Charcoal",1);
    };
    R_Date("AA-27313 charcoal",1415,55)
{
     Outlier("Charcoal",1);
    };
    R_Date("AA-50850 charcoal",1458,46)
{
     Outlier("Charcoal",1);
    };
    R_Date("AA-50853 charcoal",1332,39)
{
     Outlier("Charcoal",1);
    };
    R_Date("AA-50854 charcoal",1513,59)
{
     Outlier("Charcoal",1);
    };
```

```
    R_Date("AA-50855 charcoal",1368,50)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59749 charcoal",1410,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59750 charcoal",1520,25)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59751 charcoal",1420,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59752 charcoal",1430,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59753 charcoal",1290,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59754 charcoal",1310,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59755 charcoal",1270,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59756 charcoal",1300,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-64474 charcoal",1340,20)
{
```

```
      Outlier(“Charcoal”,1);
     };
     R_Date(“AA-21551 charcoal”,1235,50)
{
      Outlier(“Charcoal”,1);
     };
     R_Date(“AA-21553 charcoal”,1440,50)
{
      Outlier(“Charcoal”,1);
     };
     R_Date(“AA-50849 charcoal”,1297,48)
{
      Outlier(“Charcoal”,1);
     };
     R_Date(“UGAMS-59724 charcoal”,1050,20)
{
      Outlier(“Charcoal”,1);
     };
     R_Date(“UGAMS-59725 charcoal”,1260,20)
{
      Outlier(“Charcoal”,1);
     };
     R_Date(“UGAMS-59726 charcoal”,1290,20)
{
      Outlier(“Charcoal”,1);
     };
     R_Date(“UGAMS-59727 charcoal”,1180,20)
{
      Outlier(“Charcoal”,1);
     };
     R_Date(“UGAMS-59728 charcoal”,1260,20)
{
      Outlier(“Charcoal”,1);
     };
     R_Date(“UGAMS-59729 charcoal”,1100,20)
{
      Outlier(“Charcoal”,1);
     };
```

```
    R_Date("UGAMS-59730 charcoal",1180,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59731 charcoal",1430,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59732 charcoal",1250,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59733 charcoal",1230,25)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59734 charcoal",1320,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59735 charcoal",1360,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59736 charcoal",1280,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59737 charcoal",1310,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59738 charcoal",1480,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59739 charcoal",1300,20)
{
```

```
 Outlier("Charcoal",1);
};
R_Date("UGAMS-59741 charcoal",1190,20)
{
 Outlier("Charcoal",1);
};
R_Date("UGAMS-59742 carbonized bean",1290,20)
{
 Outlier("General",0.05);
};
R_Date("UGAMS-59743 charcoal",1290,20)
{
 Outlier("Charcoal",1);
};
R_Date("UGAMS-59744 charcoal",1420,20)
{
 Outlier("Charcoal",1);
};
R_Date("AA-21552 charcoal",1370,50)
{
 Outlier("Charcoal",1);
};
R_Date("AA-50851 charcoal",1337,46)
{
 Outlier("Charcoal",1);
};
R_Date("AA-50856 charcoal",1382,40)
{
 Outlier("Charcoal",1);
};
R_Date("AA-50857 charcoal",1414,39)
{
 Outlier("Charcoal",1);
};
R_Date("AA-50858 charcoal",1424,50)
{
 Outlier("Charcoal",1);
};
```

```
    R_Date("UGAMS-59740 charcoal",1290,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59745 charcoal",1460,25)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59746 charcoal",1260,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59747 charcoal",1330,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59748 charcoal",1450,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59757 charcoal",1420,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59758 charcoal",1460,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-59759 charcoal",1410,25)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-64471 charcoal",1480,20)
{
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-64472 charcoal",1440,20)
{
```

```
     Outlier("Charcoal",1);
    };
    R_Date("UGAMS-64473 charcoal",1460,20)
{
     Outlier("Charcoal",1);
    };
    Date("Date estimate Ejutla");
    Interval("Interval Ejutla");
   };
   Boundary("End Ejutla");
  };
 };
```

Appendix 2

Whole Ceramic Vessels from Offering and Mortuary Contexts at Ejutla

Context	Unit	Condition	Paste	Form	Description	Dimensions	Munsell color
tomb	6n34e	whole	gris	effigy vessel	Small effigy vessel with Cocijo imagery and beaded collar, seated with hands on legs, right hand has 5 fingers, left hand has 4 fingers	height 18 cm, receptical height 14 cm, diameter 7.6 cm, wall thickness (receptacle) 0.7 cm, wgt. 1.3 kg	10 YR 5/2
tomb	6n34e	whole	gris	plate	Shallow plate with black burnishing, some fire-clouding, has some mica temper	height 5.5 cm, rim diameter 24 cm, wall thickness 0.8 cm, wgt. 0.6 kg	7.5 YR 3/1–25/1
tomb	6n34e	whole	gris	bowl #1	Outleaned-wall bowl with burnished black surfaces, interior is a bit fire-clouded	height 8 cm, rim diameter 22 cm	7.5 YR 3/1–25/1
tomb	6n34e	whole	gris	bowl #2	Shallow outleaned-wall bowl with burnished black surfaces, mica temper	height 5.5 cm, rim diameter 15.1 cm, wall thickness 0.8 cm, wgt. 0.2 kg	N4/
offering	2s34e	whole	gris	vase	Small vase with outleaned wall and flat bottom, carved with representation of the supernatural, 1 Tiger	height 12.3 cm, bottom diameter 8.1 cm, top diameter 10.4 cm, wgt. 0.3 kg	N4/
offering	2s34e	whole	gris	vase	Small vase with outleaned wall and flat bottom, carved with representation of the supernatural, 2 J	height 12.1 cm, bottom diameter 8.1 cm, top diameter 10 cm, wgt. 0.3 kg	N5/–N4/

Appendix 3

Select Rims in the Ejutla Ceramic Assemblage That Were Large Enough to Record Form and Measure Diameter

Paste	General form	Specific form	Quantity	Rim diameters	Median diameter
amarillo	bowl	composite silhouette	1	20	20
amarillo	bowl	cylindrical	3	14–20	14
amarillo	bowl	flared rim	2	26–28	27
amarillo	bowl	miniature	1	4	4
amarillo	bowl	outleaned wall	8	10–34	24.5
amarillo	bowl	outleaned wall flared rim	3	16–25	24
amarillo	bowl	shallow outleaned	12	13.5–27	19
amarillo	cylinder	–	11	10–22	18
amarillo	cylinder	tall cylinder	1	9.5	9.5
amarillo	jar	small	5	10–15	12
café	basin	–	11	30–63.4	36
café	bowl	flared rim	2	28–30	29
café	bowl	hemispherical	1	12	12
café	bowl	miniature	1	10	10
café	bowl	outleaned wall	11	18–37	28
café	bowl	outleaned wall flared rim	7	15–50	28
café	bowl	shallow outleaned	8	14–28	20
café	bowl	small	1	16	16
café	comal	–	194	22–40	35
café	cylinder	–	5	12–20	12
café	jar	curved back neck	48	15.5–31	18.5
café	jar	large storage jar	6	34–57.5	40
café	jar	other jars	62	–	–
café	jar	seed jar	10	3.5–8	5.5
café	jar	small mouth	5	11–14	12
café	jar	straight neck	3	16–23	16
café	sahumador	shallow outleaned	59	12–32	16
crema	jar	curved back neck	1	32	32
gris	basin	–	43	22–74	33
gris	bottle	–	6	4–10	8
gris	bowl	cylindrical	15	8–28	20
gris	bowl	flared rim	4	10–34	28
gris	bowl	hemispherical	34	13–40	20
gris	bowl	miniature	15	3–11	8.3
gris	bowl	outleaned wall	222	11–40	20
gris	bowl	outleaned wall everted rim	1	23	23
gris	bowl	outleaned wall flared rim	216	14–40	26
gris	bowl	shallow outleaned	460	11–35	20
gris	bowl	shallow with flared rim	1	16	16
gris	bowl	small shallow outleaned	11	10–18	14
gris	comal	–	3	38–40	38

(*Continued*)

Paste	General form	Specific form	Quantity	Rim diameters	Median diameter
gris	cylinder	–	79	12–28	17.5
gris	cylinder	tall cylinder	22	8–22	12
gris	jar	curved back neck	1	24	24
gris	jar	globular	14	15–25	22
gris	jar	large storage jar	9	18–40	28
gris	jar	other jars	16	–	–
gris	jar	seed jar	55	3–8	6
gris	jar	small mouth	310	9–14	10
gris	molcajete	–	6	20–38	24
gris	plate	–	2	24–25.5	25
gris	sahumador	shallow outleaned	1	18	18

Appendix 4

Classic Period Figurines from the Valley of Oaxaca, Mexico

The foci of this appendix are the fired-clay figurines from the four Classic period (ca. 250–900 CE) sites in the Valley of Oaxaca, Mexico—Ejutla, El Palmillo, Lambityeco, and the Mitla Fortress (see chapter 2 for brief site descriptions)—where we have sequentially conducted excavations over three decades (see Figure 1.1), with permission from the Instituto Nacional de Antropología e Historia of Mexico. Figurines are relatively abundant in our excavated ceramic collections, albeit in varying quantities and forms. We recovered fragments of ceramic figurines in all the houses and public spaces that we excavated at the four sites and coded them according to a consistent set of characteristics and attributes. Their representations are diverse, and they were manufactured through both molding and modeling. Most figurines are already broken when recovered, generally from secondary and tertiary contexts. Rather than focus exclusively on the small sample of complete figurines that we found in rare, intact, primary contexts, we organize and analyze figurine assemblages from the entirety of our excavated contexts, which, of course, includes mostly broken, discarded fragments. This more holistic investigation is a preliminary step to outlining key parameters of formal, contextual, and spatial variation in the Classic period, Valley of Oaxaca figurine complex.

Here we provide a general classification of the broad suite of Classic period figurines from the Valley of Oaxaca (this appendix is abridged and updated from Feinman and Nicholas 2019b). We present this classification scheme here as it is useful to contextualize the figurine assemblage from the excavations we implemented in Ejutla, and the original version of this appendix is published in a venue not readily accessible to researchers focused on prehispanic Mesoamerica. The figurines we report on come mostly from domestic contexts (both commoner and high-status households), but at Lambityeco we also excavated civic-ceremonial areas where public rituals took place. The figurines were recovered from a diverse range of contexts, including offerings, burials, pits filled with debris from ritual activities, domestic trash deposits, and construction fill. We do not have space to provide an in-depth description or analysis of the full extent of representational variability among the more than 7500 whole and fragmentary figurines in our collections or a detailed catalogue of the specific contexts in which they are found. Rather, we group the corpus of figurines into broad categories that feature suites of co-occurring attributes as an initial step to define basic spatial, contextual, and behavioral differences in figurine use (Table A4.1).

Table A4.1. Figurine and whistle categories and principal variants at four Classic period sites in the Valley of Oaxaca.

Categories and principal variants*	Lambityeco	Ejutla	Mitla Fortress	El Palmillo low status	El Palmillo high status	El Palmillo ballcourt
modeled animal	**125**	**91**	**34**	**69**	**39**	**2**
bird/owl	10	24	3	4	4	–
dog	101	13	26	52	19	1
other animal	14	54	5	13	16	1
miniature anthropomorph	**135**	**110**	**58**	**112**	**90**	**5**
miniature female	43	–	40	11	24	2
miniature warrior	10	20	4	6	6	–
miniature indeterminate	–	9	–	–	–	–
small modeled figure	82	81	14	95	60	3
female #1 (braided headdress)	**213**	**217**	**26**	**17**	**23**	**1**
braided headdress (head only)	35	54	6	8	9	1
decorated tunic	121	24	9	3	2	–
plain banded tunic	57	139	11	6	12	–
female #2 (intricate headdress)	**405**	**4**	**6**	**6**	**7**	**–**
decorated garment/arms extended	71	–	2	3	3	–
decorated garment/tunic/arms at side	136	–	–	–	–	–

(*Continued*)

Categories and principal variants*	Lambityeco	Ejutla	Mitla Fortress	El Palmillo low status	El Palmillo high status	El Palmillo ballcourt
decorated garment/tunic/arms crossed/on chest	85	4	–	2	1	–
intricate headdress (head only)	113	–	4	1	3	–
female #3 (small crossed arms)	**127**	**2**	**13**	**3**	**2**	**–**
male/warrior	**370**	**417**	**138**	**62**	**110**	**16**
cotton armor	91	58	41	25	35	6
feathered cape	39	9	14	5	12	5
feathered hood (head only)	59	50	19	9	15	1
helmet/turban headgear (head only)	58	108	31	9	13	2
indeterminate head or torso	12	–	3	1	1	–
loincloth	10	128	–	1	7	–
plain jacket	14	13	7	–	5	–
priest	15	39	12	4	13	–
tiered hood (head only)	34	12	6	7	8	2
trophy head	38	–	5	1	1	–
whistle (small)	**209**	**50**	**74**	**12**	**29**	**1**
bird whistle	–	–	–	2	–	–
buccal whistle	3	1	12	3	11	–
feathered headdress	144	37	61	7	14	1
whistle base	62	12	1	–	2	–
whistle (large globular)	**2018**	**52**	**32**	**62**	**45**	**1**
bird/bat/owl headdress	83	4	3	1	4	–
fauces de serpiente	237	10	7	3	–	–
feathered headdress	299	7	7	9	14	–
jaguar headdress	279	2	1	–	4	–
serpent head	29	3	1	1	1	–
whistle base	654	4	–	13	–	–
whistle head indeterminate	437	22	13	35	22	1
indeterminate anthropomorph	**341**	**633**	**145**	**178**	**157**	**3**

* does not include all indeterminate fragments.

We treat whistles as a subset of figurines (e.g., Lopiparo and Hendon 2009; Martínez López and Winter 1994; Triadan 2007), since representational sections of whistle fragments are not always possible to distinguish from other figurines. Some molded, flatback figurines have hollow attachments on the lower back torso that can be used as a support or as a whistle (Paddock 1983, 203), whereas others do not. The representational portions of some of these pieces are basically indistinguishable. Figurines and whistles are typically broken at the neck, so it can be a puzzle to link specific imagery from heads and torsos.

Most prior interpretations of Mesoamerican fired-clay figurines have stressed their roles in household ritual. Indeed, we found that most figurines were produced and utilized in domestic contexts, but other classes of figurines, especially certain whistles, were heavily used in public rituals enacted in association with civic-ceremonial structures.

A4.1. Background to Oaxaca Figurines

Fired-clay figurines and whistles have long been recognized as part of the archaeological ceramic complex from the prehispanic Valley of Oaxaca (Boos 1966; Caso and Bernal 1952; Caso et al. 1967; Feinman 2018). Early on it was noted that there were important differences between Formative figurines (ca. 1600 BC–200 CE) and Classic/Postclassic figurines (after ca. 250 CE). Most Formative period figurines in Oaxaca are small solid forms that were modeled by hand and include both anthropomorphic and, in lower quantities, zoomorphic representations (Drennan 1976; Marcus 1998). At that time, almost all the human forms are thought to represent females, while dogs, birds, and frogs are the most common animals (Blomster 2009, 124–31; Marcus 1998, 3; Martínez López and Winter 1994, 7). The human figures usually lack clothes and have an array of elaborate hairdos, a highly distinguishing feature (Marcus 1998, 31). Contextually, the figurines are mostly associated with females, either placed in their burials or used in household ancestor rituals conducted by women (Marcus 1998, 2009b).

By the Classic period, mold-made figurines that represent both males and females became the dominant form in Oaxaca (e.g., Feinman 2018). In contrast to Formative figurines, Classic period figurines are usually clothed; they often wear decorated cotton garments and have elaborate headdresses (e.g., Caso and Bernal 1952, 293, 295; Martínez López and Winter 1994, 6–67). Feathers are often represented in both headdresses (e.g., Caso and Bernal 1952, 179, 309) and garments (e.g., Scott 1993, 20).

Classic period figurines are mostly known from the prehispanic capital city, Monte Albán (Caso et al. 1967; see also Bernal 1965; Caso and Bernal 1952; Kuttruff 1978; Martínez López and Winter 1994; Paddock 1966). In these earlier publications, figurines were mostly discussed through a culture historical lens as chronological or cultural markers (see also Sánchez Santiago and López Zárate 2017), with figurines from Monte Albán seen as typical for the entire valley. They also were thought to be representations of the supernatural, with specific figurine varieties identified as different goddesses (e.g., Caso and Bernal 1952; see also Boos 1966). These early discussions gave little consideration to spatial variation or to the significance of different contexts in which specific figurines were found.

Although intact deposits of complete figurines arranged in scenes naturally have received the greatest attention as a vantage to past ritual activities (Marcus 2009b, 2019), we believe that the large corpus of broken figurines recovered from other contexts can also provide useful information on how and where different broad categories of figurines and whistles were used and how variations in representations and use patterned across contexts and sites. For the Valley of Oaxaca, no prior study has analyzed a large corpus of figurines in conjunction with a consideration of distributional variation from a suite of contexts. Sue Scott (1993) defined a set of warrior figurines from several excavated palaces at Lambityeco, but the warriors in her study represent only one class of figurines that were analytically culled from a much larger assemblage.

A4.2. Classic Period Figurines in the Valley of Oaxaca

In developing our classification, we reviewed roughly contemporaneous assemblages of figurines that had been reported or published from other sites in the Valley of Oaxaca (see Figure 1.1). We excavated only in the civic-ceremonial core of Lambityeco, but other sources have reported on figurines from excavations in domestic areas (López Zárate 2016) and from the palaces north of the civic-ceremonial core of Lambityeco that were excavated by Paddock (Scott 1993). There also is a large assemblage of Classic period figurines from Macuilxochitl (Faulseit 2013; Faulseit et al. 2016; López Zárate 2016), located approximately 5 km northwest of Lambityeco. At that site, there is evidence of figurine production on one excavated terrace (Faulseit et al. 2016), which includes figurine representations also present at Lambityeco. For Yagul, another archaeological settlement near Lambityeco, Bernal and Gamio's (1974) report on excavations in a palatial residence illustrates many figurines. Several publications report on figurines from Miahuatlán in the southern part of the Central Valleys of Oaxaca, just south of Ejutla (Brockington 1973; Markman 1981). A small assemblage of figurines from Jalieza, in the Valle Grande, are included in a report on excavations in domestic contexts at the site (Elson et al. 2010). A small subset of figurines from the region's primary center of Monte Albán (Blanton 1978) are published in several books (Boos 1966; Caso and Bernal 1952; Caso et al. 1967; Kuttruff 1978; López Martínez and Winter 1994), but the selective reporting and the somewhat spare accompanying information on context limit direct comparisons with samples from that key site. As relevant, we drew on these other works as we coded the figurines at each of these sites in line with the schema that we employed for the assemblages we excavated. In certain cases, the figurines that are reported in the available literature include more complete figurines that permit us to match the broken mold-made heads and torsos in our collections and visualize a more complete representation.

The molded figurines that dominate the Classic period assemblage in the Valley of Oaxaca were made using technology not previously employed before the Classic period; yet figurines modeled by hand continued to be made and used at that time, and they are not rare finds. In our analysis, we tried to expand our perspective on Classic period figurines and to start to understand if and how the use of the new molded forms differed from the modeled figurines of the Formative period.

Our approach is broadly similar to that of Lesure (1999), who considers figurines both as products and as ritual implements. We classify figurines in broad categories without making assumptions about the specific personages that are represented. Because we have a large assemblage with context, we can provide insight into spatial variation in figurine use. Why do some contexts have many more figurines than others? Is there site-specific or context-specific variation in figurine assemblages? Can we define communal (public ritual) instead of domestic use for some classes of figurines? Prehispanic Mesoamericans used music to communicate with the supernatural world (Houston 2006, 143; Sánchez Santiago 2005; Taube 2004, 78), and it was an integral part of ballgame ritual (Wyllie 2010, 216; Zender 2004). Are different sets of whistles used for making music in domestic rituals as opposed to the more public rituals associated with the Mesoamerican ballgame?

A4.3. Categories of Classic Period Figurines in the Valley of Oaxaca

Classic period figurines in the Valley of Oaxaca are diverse in form, size, representation, and production technique, ranging from small, modeled animals and human figures to larger mold-made ones with flat backs that include females attired in a broad array of dress and headdress styles and males outfitted in a range of warrior garb. There also are large and small anthropomorphic whistles with modeled bodies and molded heads. We became aware of not only this diversity in form but also the dizzying array of variation in the expression of individual attributes as we excavated the four different sites and the number of figurines and whistles in our collections increased to more than 7500. The 2005 figurines and fragments from Ejutla include many wasters, and a number of the figurine molds we recovered match some of the more common figurine varieties at the site (see sections 7.1 and 7.7; Feinman and Nicholas 2004a, 175–76). Although we found figurine fragments in all houses and public spaces at El Palmillo, they were much less abundant than at Ejutla, with 1169 figurine fragments spread out over the eight houses and adjacent spaces. There were slightly more figurines in the upper palatial residences than in the lower houses. Evidence for figurine production was absent. Figurines were a bit more abundant on the three terraces at the Mitla Fortress (562) than on terraces at El Palmillo. There was minimal evidence for ceramic production, including for figurines. At Lambityeco, most of the material remains were associated with ritual activities. In addition to an abundance of large ollas and serving vessels that were used in feasting events administered by the resident priests of Mound 165, we recovered 3870 figurine and whistle fragments. The figurines and whistles were recovered from the residence and all the public spaces, including several features filled with figurine and whistle fragments that appear to be event-related discard.

To understand whole figurine assemblages, and not just figurines found in intact primary contexts, we knew that we could not just describe all the individual attributes of the figurines, or what Paddock (1983, 203) described as a "nearly endless" array of variability, and that we needed ways to organize and compare larger figurine assemblages from different contexts. To make sense of the wide variety of figurine forms and attributes, we decided it would be useful to group this tremendous diversity into a smaller set of broad categories that we could more easily examine across contexts and sites. This first classificatory step provides a way to define the parameters and general frequencies of the diverse forms of Classic period figurines and to investigate how and in what distinct contexts different figurines and whistles were most abundant.

Leaving aside the great diversity in the finer details of form and representation, we see in this assemblage eight major categories of Classic period figurines and whistles—animals, anthropomorphic miniatures, three distinct sets of females, male warriors, small whistles, and large globular whistles (see Table A4.1). Basically, size, production technique, and representation are the main criteria that we used to distinguish these categories. We base our gender assignments on prior studies of prehispanic figurines in Oaxaca and elsewhere in Mesoamerica (Halperin 2014, 54; López Zárate 2014; Scott 1993; Serra Puche and Durand V. 1998; Stark et al. 1998, 19–20; Triadan 2007, 276–77) and on extensive discussions of Mesoamerican attire, including in late prehispanic codices (Anawalt 1981a, 1981b, 1985; Berdan and Anawalt 1997; Filloy Nadal 2017, figure 3; McCafferty and McCafferty 1996).

We identify three major categories of females but only one category for male warrior figurines; artifact sizes and broad styles of headdresses and garments tend to co-occur in female figurines, whereas the attribute-level variability in male figurines tends to be cross-cutting in ways that do not accord with the definition of discrete overarching categories. For each major category, we have also defined principal variants or subcategories that have specific attributes or imagery. Here we define the key elements of each category and describe the principal variants. At this stage, we gloss over the great idiosyncratic variability in the finer details, facial features, and minor size discrepancies, focusing on consistent, repetitive patterning in the representations of headgear and garments.

In our collections, from approximately half (Ejutla) to 90% (Lambityeco) of the figurines were sufficiently well preserved or complete enough to assign to one of the eight major categories. Those artifacts too fragmentary or eroded to code to a category are not considered further in this analysis. Overall, the modeled and miniature figurines are the most variable. Not unexpectedly, the larger molded figurines are more standardized in form and representation. Although our classification was developed principally on the large number of figurines in our collections, photographs and illustrations of Classic period figurines and whistles from elsewhere in the Valley of Oaxaca (Bernal and Gamio 1974; Boos 1966; Brockington 1973; Caso and Bernal 1952; Caso et al. 1967; Faulseit 2013; Faulseit et al. 2016; Kuttruff 1978; López Zárate 2016; Markman 1981; Martínez López and Winter 1994; Paddock 1966; Sánchez Santiago 2005; Scott 1993) helped inform and confirm the patterns we see in our collections. In some of those works (e.g., Elson et al. 2010), there are variants not present in our collections. Our classification is a pilot study to see if the variable distribution of broad categories of figurines in different contexts can help us understand different behaviors in the production and use of figurines. We intend it as a roadmap that others working at Classic period sites in the Valley of Oaxaca may find helpful for organizing their figurine assemblages, fully suspecting that a broader study of the full corpus of Classic period figurines from across the valley by us and, hopefully, others will foster refinements and additions to this classification.

A4.3.1. Animal Figurines

Most of the animal figurines are small, solid forms that have fully modeled torsos and heads on which facial features are formed through incision or the addition of small appliques (Figure A4.1). Because they are modeled by hand, there is great variability in how different parts of the bodies are portrayed or emphasized. Dogs are most commonly represented (Figure A4.1 bottom; Martínez López and Winter 1994, 115, figure 92). For dogs, most facial details tend to be incised, although the eyes more typically are formed by adding a variety of small applique circles to the face.

Birds and other animals occur in lower numbers. Birdlike figures have incised or appliqued eyes on the sides of large modeled beaks (Figure A4.1 top). Some have features that appear to represent owls and bats. Other figures can be identified as frogs, opossums, jaguars, monkeys, bear cubs, and turtles (see also Faulseit 2013, 208; Martínez López and Winter 1994, 110, figure 87).

A4.3.2. Miniature Anthropomorphic Figurines

We include small modeled and molded figurines in this category (Figure A4.2; López Zárate 2016, 70, figure 3.9). Size is a key criterion. The small molded figurines, when complete, tend to be no more than 6–7 cm tall; there is a bit more range in the size of modeled figurines. As with the animals, there is considerable variability in the anthropomorphic modeled figures. Generally, they are simple, ranging from small bodies with crudely formed limbs to torsos with stump legs to simply a head with almost no body (Figure A4.2a–c). Facial features are typically incised, although the eyes may be appliqued. A few have breasts to identify them as female, but the intended sex often cannot be determined.

The small molded figurines can be divided into females and warriors. The females typically have braided headdresses and wear a *quechquémitl* (long triangular tunic, or *huipil*) (Figure A4.2d–f). The tunics may be plain or have a decorated border. Most of the figures wear some kind of jewelry around their necks. Their arms may be down at their sides or crossed over their chests. A few small molded figurines are warriors (Figure A4.2g–i). They typically wear some kind of helmet. Most of the torsos have loincloths.

A4.3.3. Female #1 (Braided Headdress)

Female figurines largely fall into two categories that we call female #1 and female #2, both of which may be as tall as 15–17 cm; a consistently smaller figurine with a tight set of attributes is female #3. The key characteristics of female #1 are a braided headdress, typically one braided band on the forehead, and a quechquémitl over a simple, long garment (Figure A4.3; Caso and Bernal 1952, 294, figure 446). These two features almost always co-occur in the more complete figurines that are not broken across the neck. Based on how the garments are displayed, there are two principal variants of female #1. Both variants have short arms at their sides below the tunic, a necklace of one or two strands of beads, and short, stump-like legs. Although there is variability in how the braids are displayed (how many strands, size of braid, and other details beyond the typically simple braid; Figure A4.3a–b), there is no one style of braided headdress that clearly goes with each broad garment variant. Compared to female #2, the imagery in the braided headdresses is much less complex.

Figure A4.1. Small modeled animal figurines. Top: Bird figurine (whistle) from El Palmillo (left) and two bird heads from Lambityeco (right). Bottom: dog figurines from Lambityeco.

Figure A4.2. Miniature anthropomorphic figurines. Modeled figurines from Ejutla (a), El Palmillo (b), and Lambityeco (c). Molded females from the Mitla Fortress (d), El Palmillo (e), and Lambityeco (f). Molded warriors from Lambityeco (g), El Palmillo (h), and the Mitla Fortress (i).

The first variant of female #1 wears a plain tunic over a long garment (Figure A4.3c–d). The notable characteristic is the lack of decoration beyond a beaded necklace. The tunic may have a defined border, but neither the border nor any other part of the tunic is decorated. The garment may have a basal band of variable width, but as with the tunic, there is no decoration. In most examples the garment does not have a belt. This variant of female #1 often has an appliqué back support.

The tunic and garment of the second variant of female #1 are decorated, but not very elaborately. The tunics may be adorned with a border panel of crude zigzag lines, small *greca*-like motifs, or other simple design (Figure A4.3e–f). Most of the garments have a small belt with a herringbone pattern (possibly a rope) below the tip of the tunic; those that aren't belted typically have a basal border with simple decoration, either a series of horizontal parallel incised lines or short vertical lines that provide a beaded appearance. Only one example of this variant in our collections has a back support.

A4.3.4. Female #2 (Intricate Headdress)

The key characteristic of female #2 is a large, rounded headdress adorned with a complex set of intricate circular

Figure A4.3. Female #1 with braided headdresses and simple garments. Braided headdresses from Ejutla (a) and Lambityeco (b). Female variant with plain tunics and garments from Ejutla (c) and Lambityeco (d). Female variant with simply decorated tunics and garments from Lambityeco (e and f).

designs (Figure A4.4; Caso and Bernal 1952, 90, figure 445). There is considerable variability in the exact representations, which include multiple sets of small circles and short lines, concentric semicircular lines, or other serpentine elements. This juxtaposition of curvilinear imagery with circular orbs may encode information about the annual calendrical cycle (Feinman and Nicholas 2015; Solar et al. 2011), as prehispanic Mesoamerican mythic beliefs envisioned a plumed serpent that carried the sun across the heavens (e.g., Taube 2015).

As with the intricate complexity of the headdresses, female #2's garments are more elaborately decorated than those of female #1. The former figure is typically also more heavily bejeweled. The design motifs in the headdresses are presented in a wide array of variations, but the basic

Figure A4.4. Female #2 heads with intricate headdresses from Lambityeco.

elements and form of this style of headdress are both consistent in form as well as component elements, and they are distinctive from the head attires worn by any other categories of figures. Because few figurines are complete when we find them, we can identify only a few variants of female #2 that tend to co-occur with specific torsos. The torsos more clearly fall into three principal variants. The first variant does not wear a quechquémitl; the figure's wide decorated belt encircles a garment that typically has a long basal fringe above stump legs (Figure A4.5 top). The figure is adorned with a large elaborate two- or three-strand necklace that covers the entire chest, and its short arms are extended out on both sides.

The second variant wears a short elaborately decorated quechquémitl above a garment with a decorated belt and basal fringe; it is also richly adorned in jewelry (Figure A4.5 center). Short arms hang down the side below the decorated border of the tunic. The third variant also wears a decorated tunic over a garment with a decorated belt, but the arms are crossed on the chest (Figure A4.5 bottom). The garment typically has fringe or other decorative elements on the base of the garment. The decorated quechquémitl may be asymmetrical, which is not characteristic of female #1. We do not have any examples of female #2 that have appliqued back supports.

A4.3.5. Female #3 (Small with Crossed Arms)

The third female is intermediate in size, usually between about 9 and 12 cm tall. This figurine category is more standardized than the other two categories of females (Figure A4.6; Scott 1993, 18, figure 32). The figures are always thin and tabular; they have a simple, low, tightly braided headdress; their necks are adorned with a single strand of beads; their arms are crossed on their chests; and they wear a short quechquémitl with plain border that ends above a decorated band near the base of the garment.

A4.3.6. Male/Warrior Figurines

Male figurines are a diverse group with several broad variants of headgear and garments that do not appear to co-occur as consistently as they do for the females. There are few complete warrior figurines in our collections, but in the future, availability of a larger set of more complete warrior figurines may permit refinements. Most of the male figurines are costumed as warriors (Figure A4.7). Certain characteristics of warriors, such as those holding staffs and shields, are common representations and are not tied exclusively to a specific item of clothing or particular kind of headgear. Most warriors had small supports attached to back of the base of the torso. The attachments are hollow with a small hole that can be blown like a whistle (Sánchez Santiago and López Zárate 2017, figure 4.5; Paddock 1983, 203).

There are five principal variants for the torso and three main variants for headgear. The most common imagery on the torso is a textured garment that represents cotton armor (Figure A4.7a–d; López Zárate 2014; Scott 1993, figures 35–38). The garment is usually short, textured with small raised bumps, and the figure typically holds a

Figure A4.5. Female #2 torsos with decorated garments from Lambityeco.

round shield (variable in size and decoration) in one hand (usually left) and a long, narrow staff in the other (usually right). In contrast to the stump legs of the females, long legs extend below the garment; ballplayer imagery such as knee bands or leg armor is often visible on the legs (Halperin 2014, 63).

Another male variant wears a long cape comprising tiers of narrow feathers (Figure A4.7e–g; Scott 1993, figures 49–51). The cape may be closed or open down the middle revealing a loincloth or other undergarment. The figure typically holds a small shield and long staff near the center of the torso. The arms are usually covered by the cape and not visible as they are in the warriors wearing cotton armor.

The distinguishing feature of a third variant of warrior is the presence of a loincloth and the absence of an upper garment (Figure A4.7h). The loincloths vary in length and elaboration but often have no decoration at all. Some

Figure A4.6. Female #3 small figurines with crossed arms from Lambityeco.

figures wear a necklace, others do not. Their arms usually hang down at their sides, but in a small subset they are bent and hold a large shield and a long staff.

A less common variant wears an untextured upper garment, with a seam or other adornment down the center, like a short jacket (Figure A4.7i–j; Scott 1993, figures 44–45). For these, a loincloth is sometimes present, but not always. All our examples hold a small shield in their left hand and a narrow staff in their right hand.

The final variant depicts what may be priests, wearing either a long robe or a large pleated skirt (Figure A4.8a–d; Scott 1993, figure 34). The robe is draped over the shoulders and covers a long garment; the arms of the individual stick out from the robe and may be clasped or just placed on the chest. The individual wearing the skirt is usually holding a circular object or orb on his abdomen above the pleated garment. One skirt-wearing male portrayed in select ceramic effigy vessels from the Late Classic period in the Valley of Oaxaca has been associated with the supernatural Xipe Totec (Scott 1993; Sellen 2003).

A small subset of warriors have a human trophy head hanging upside down on the chest, between the legs, or held in the hand by the hair (Figure A4.8e–f; López Zárate 2014, 239–40, figure 13; Moser 1973, figure 21; Scott 1993, figures 46–48). Although they are most often associated with warriors wearing cotton armor, they are not exclusive to that variant; some examples of warriors wearing feathered capes or plain jackets also hold the trophy head in their hands or hang it around their necks.

The warrior headgear falls into three principal categories (see López Zárate 2014; Scott 1993). One variant includes a range of helmets and turban-like headdresses; the helmets may be simple or highly elaborated (Figure A4.8g–h). Another common variant wears a feathered hood (Figure A4.8i–j). The hood typically surrounds the face and has a tall tuft of feathers on the top of the hood. Less common but distinctive is a variant that wears a plain hood around the face, above which there are tiers of plain bands or disks and a tuft of feathers at the top (Figure A4.8k–l).

A4.3.7. Small Whistles

The entire torso of a small whistle is modeled so that the resonating hollow chamber is part of the figure and not an appliqued addition like the hollow supports of the warriors (Figure A4.9a; Sánchez Santiago and López Zárate 2017, figure 4.9). The body is narrow with a small hollow cavity near the base. The whistles stand on two small feet in the front of the torso and a small slab-like protrusion on the back below an opening that serves as the blow hole.

Figure A4.7. Male figurines. Warriors wearing cotton armor from Lambityeco (a), El Palmillo (b), the Mitla Fortress (c), and Ejutla (d). Warriors wearing feathered capes from Lambityeco (e), the Mitla Fortress (f), and El Palmillo (g). Warriors wearing only a loincloth from Ejutla (h). Warrior wearing plain jacket from the Mitla Fortress (i) and Lambityeco (j).

Figure A4.8. Male figurines. Possible priests from the Mitla Fortress (a), El Palmillo (b), Lambityeco (c) and Ejutla (d). Warriors with trophy heads from Lambityeco (e) and El Palmillo (f). Warriors wearing helmets from the Mitla Fortress (g) and Lambityeco (h); feathered hoods from Lambityeco (i) and the Mitla Fortress (j); tiered hoods from El Palmillo (k) and Lambityeco (l).

Figure A4.9. Small whistles. Complete bodies with blow holes from Lambityeco (a). Complete small whistles with feathered headdresses from the Mitla Fortress (b) and Lambityeco (c). Feathered headdress fragments from Lambityeco (d–e). Buccal whistles from Lambityeco (f), the Mitla Fortress (g), El Palmillo (h), and Ejutla (i).

The molded heads that are added to the modeled torsos are much more variable, although the headdresses typically consist of three lobes or sets of long, narrow, rayed feathers above a curving band or lappet with *fauces de serpiente* (jaws of snake) representations (Figures A4.9b–e). The headdresses are wide and large in comparison to the small faces and torsos of the whistles. Two of the few complete small whistles in our collections are 14–15 cm tall.

We include in the small whistle category buccal whistles (Figure A4.9f–i; Sánchez Santiago 2014). These are rare. One long edge of these small rectangular plaque-like whistles

Figure A4.10. Large globular whistles from Lambityeco. Front and back with blow hole (a), whistle head with feathered headdress (b), headdresses with owl imagery (c), whistle heads with *fauces de serpiente* headdresses (d), and whistle headdresses with jaguar faces (e–f).

Table A4.2. Quantity and percentage of figurine/whistles in each broad category*.

Category	Ejutla	Mitla Fortress	El Palmillo low status	El Palmillo high status	El Palmillo ballcourt	Lambityeco
modeled animal	91	34	69	39	2	125
miniature anthropomorphic	110	58	112	90	5	135
female #1 (braided headdress)	217	26	17	23	1	213
female #2 (intricate headdress)	4	6	6	7	–	405
female #3 (small crossed arms)	2	13	3	2	–	127
male/warrior	417	138	62	110	16	370
whistle (small)	50	74	12	29	1	209
whistle (large globular)	52	32	62	45	1	2018
total	943	381	343	345	26	3602
modeled animal	9.7%	8.9%	20.2%	11.3%	7.7%	3.5%
miniature anthropomorphic	11.7%	15.2%	32.7%	26.1%	19.2%	3.7%
female #1 (braided headdress)	23.0%	6.8%	5.0%	6.7%	3.8%	5.9%
female #2 (intricate headdress)	0.4%	1.6%	1.8%	2.0%	–	11.2%
female #3 (small crossed arms)	0.2%	3.4%	0.9%	0.6%	–	3.5%
male/warrior	44.2%	36.2%	18.1%	31.9%	61.5%	10.3%
whistle (small)	5.3%	19.4%	3.5%	8.4%	3.8%	5.8%
whistle (large globular)	5.5%	8.4%	18.1%	13.0%	3.8%	56.0%

*percentages are based only on the number of figurines that could be classed to one of the eight categories.

is grooved, with a perforation on the edge that passes through the groove. There is often a second perforation near one of the ends, likely for stringing. Most of these whistles are made of ceramics, although a few in our collections were made of stone, including one from Ejutla. Although not a common artifact, these small whistles have been recovered from all four sites.

A4.3.8. Large Globular Whistles

These whistles have a large, globular, hollow body with a narrow neck into which a molded head has been inserted (Figure A4.10a; Martínez López and Winter 1994, figure 49; Sánchez Santiago 2005). Two fin-like vertical appliques are appended to the torso, one on each side in place of arms. The large whistles stand on two spike-like appliques at the base of the front of the body and a large slab-like tail on the back below the blow hole.

All of the headdresses have some kind of large feather representation, but several variants have additional imagery of bats/owls, snakes/jaws of snake, and jaguars. Within each of these principal variants is a wide range of portrayals of the animals. Whistles categorized as having a feathered headdress either have no animal representation beyond feathers or simply were too fragmentary to know (Figure A4.10b).

The bat or owl face is stylized in different manners but is usually placed above the figure's forehead in the center of the headdress (Figure A4.10c). There is typically a tuft of feathers above the bird's face and feathers that fan out on either side.

Fauces de serpiente (jaws of snakes) representations are very common and variable, but they typically occur in a central cartouche in the headdress above the forehead of the figure (Figure A4.10d). In many of these whistles, there is some representation of a jaguar, often just the nose, above the cartouche. The cartouche is usually ensconced in or situated above sets of curving lappets that drape down the sides of the forehead, with large feathers above the lappets and surrounding the cartouche.

Jaguars are prominently displayed in another whistle headdress variant (Figure A4.10e–f). Typically, a complete jaguar face, snarling with teeth visible, sits in the center of the headdress above the forehead of the figure. There are large feathers to the sides and the top of the jaguar. The stylization of the jaguar face is variable, but one specific whistle headdress stands out for its large size and specific imagery. In this variant, the jaguar face is centered between a lappet that contains the symbol for 1 Jaguar on the left and a stylized snake face and reptilian eye on the right (Figure A4.10f). This is the largest headdress in our collections, with a width of 16 cm.

A4.4. Interpretation and Discussion

A central goal in broadly classifying the figurines in our collections and looking at contextual differences in their distribution is to elucidate behavioral patterns.

The excavated deposits that we exposed can be grouped into three principal contexts: domestic, production, and civic-ceremonial. The production-related context is still in a residential/domestic setting (Feinman 1999), but the nature of the artifacts and features vary considerably from other houses. At three of the sites we excavated in domestic areas: three commoner houses at the Mitla Fortress, one house of intermediate status at Ejutla, and three elite and five commoner houses at El Palmillo. A small ballcourt was attached to one of the elaborate residences at El Palmillo. At Lambityeco we excavated in the civic-ceremonial core of Lambityeco, in an area that includes a priest's residence (Feinman and Nicholas 2016b; Feinman et al. 2016) and a much larger ballcourt (Feinman and Nicholas 2019a). The residents of the Ejutla house were also involved in ceramic production, including figurines (Feinman 1999; Feinman and Nicholas 2004a). Because of these site-to-site differences, the figurine assemblages from the four sites are not entirely equivalent, and our interpretations should be considered preliminary.

Although most published literature for prehispanic Mesoamerica emphasizes the use of figurines in domestic rituals (e.g., Marcus 1998, 2009b; Triadan 2007), there is evidence that figurines were used in public ritual contexts during the Classic period (Halperin 2017; Vera Estrada and García Wigueras 2014). By looking at the distribution of the broad categories of figurines in our sample, we can begin to identify differences in figurine use in domestic and public spaces, and also see how different the production context is from others.

We outline broad expectations for these three different contexts. In domestic areas, we would expect to find a higher proportion of modeled figurines than in civic-ceremonial areas. Modeled figurines were widely used in domestic contexts during the Formative period (Marcus 1998, 2009b). The modeled figurines could be made by people with less expertise, so we would expect them to be variable and well represented in houses. We also would expect higher proportions of small whistles than larger ones in domestic contexts.

Production contexts should be characterized not only by large quantities of figurines in general, but also by lopsided numbers of specific varieties of figurines. We also would expect other indicators of production, including wasters and molds. In civic-ceremonial contexts, we would expect to find lots of large whistles for making music in public ritual settings (Broda 1970, 210; Wyllie 2010; Zender 2004). The large figurine quantities should not be accompanied by indicators of production activities.

The figurine assemblages from the four sites basically conform to these general expectations. Small modeled animals and miniature anthropomorphic figurines are a much smaller component of the figurine assemblage in the civic-ceremonial core of Lambityeco than in the domestic contexts at the three other sites (Table A4.2). These small figures were made for and apparently used mostly in household activities, sometimes placed in burials. Although small modeled dogs and modeled anthropomorphic figures are the most broadly distributed across domestic contexts and are found in each house (see Table A4.1), there is little consistency in which specific variant predominates at each site. The small molded anthropomorphic figurines also are variable but well represented at all sites.

We did note significant differences in the distribution of the three categories of females among the four sites. All three categories are present in much higher numbers at Lambityeco and are poorly represented in the domestic contexts that we excavated at El Palmillo and the Mitla Fortress. The only exception is the variant of female #1 who wears a plain tunic and garment, present at Ejutla (see Table A4.1). Most of the female #1 figurines at Lambityeco wear decorated tunics; there are many fewer with plain tunics. This pattern is reversed at Ejutla, where the female with plain tunic is the most abundant variety in the entire assemblage, and there are few female figurines in decorated tunics. Given the abundance of this female at Ejutla and several molds for braided headdresses (see Figure 7.16) recovered from the fill of ceramic firing features (Balkansky et al. 1997), this female variant appears to have been produced in Ejutla, which would account for its overrepresentation compared to the figurine assemblages at the other sites. There is a similar overabundance of a variant of female #2 at Macuilxochitl, where numerous molds for producing that specific variant were found during excavations on one residential terrace (Faulseit et al. 2016, 316). Fragments of this particular variant are present at Lambityeco, and it is possible that they were made at Macuilxochitl.

At Lambityeco, two of the female variants are tied to public ritual events (Feinman et al. 2016). On the platform and the plaza situated at the north side of the ballcourt in Lambityeco's civic-ceremonial core, we excavated two separate trash-filled pits where we found discrete sets of female figurines, each associated with only one of the pits. The different portrayal of the cotton garments, jewelry, and headdresses of these two females likely was significant. In the pit on the plaza, we recovered numerous fragments of a variant of female #2, all of which had the exact same intricate headdress of concentric serpentine lines (see Figure A4.4 top left) and/or were wearing precisely equivalent decorated garments with basal fringe, amplified by an elaborate necklace (see Figure A4.5 middle row left). Many of the fragments could be fit together, so that there was a minimum number of eight figurines. The other pit contained numerous fragments of a variant of female #1 wearing a simple braided headdress and a simply decorated quechquémitl (see Figure A4.3e). Again, the figurines had been broken before being deposited in the pit; we were able to refit many fragments for a minimum of 11 figurines. Examples of these figurines, though rare, are present in domestic contexts at the other sites we excavated; it is possible that although they were made and stored in domestic areas, they were brought to public venues to be used in communal ritual events (e.g., Halperin 2017).

Female #3 is found with any frequency only at Lambityeco and is very rare at the other three sites. It also is rare or not present in all other published figurine assemblages in the valley (Bernal and Gamio 1974; Brockington 1973; Elson et al. 2010; Faulseit 2013; Faulseit et al. 2016; Markman 1981), including Monte Albán (Caso and Bernal 1952; Martínez López and Winter 1994). We did not recover any from intact ritual deposits, and proportionally this female category is more abundant in domestic areas at Lambityeco (López Zárate 2016) than in the civic-ceremonial area. These figurines appear to have been made at Lambityeco for largely local use in domestic ritual.

Although whistles are present at all four sites, there are differences in the distribution of small and large whistles. Small whistles are largely present in similar proportions, whereas large whistles are disproportionately abundant at Lambityeco, where they are more than half of the figurine assemblage, far more than at any other site. The small whistles generally appear to have been used in domestic rituals and the large whistles in public ones. Another important difference is the imagery in the headdresses of large whistles. *Fauces de serpiente* and bat/owl imagery are present on whistles at all sites; these representations are widely shared with other sites in the Valley of Oaxaca (Caso and Bernal 1952; Faulseit et al. 2016; Martínez López and Winter 1994). At Lambityeco, however, we recovered hundreds of large whistle headdresses that include prominent jaguar imagery; whistles with jaguar representations are rare elsewhere in the valley, even in reported assemblages from Monte Albán. The use of large whistles with jaguar headdresses may have been limited to specific public rituals in civic-ceremonial areas.

One particular variant of these whistles (1 Jaguar) combines prominent jaguar and snake imagery. Across Mesoamerica, the juxtaposition of jaguar-snake imagery is associated with the cycle of the Sun, renewal, and the ballgame (Barrios and Tokovinine 2005; Cohodas 1975). At Lambityeco, we recovered more than 100 whistle fragments with this specific jaguar headdress. In published assemblages to date, the only other site where this particular variant is present is nearby Macuilxochitl (Faulseit et al. 2016; López Zárate 2016), where there are fewer than a dozen, mostly small fragments, many of which were found on a terrace whose residents engaged in figurine production (Faulseit et al. 2016, 316). We found a set of 1 Jaguar whistles in the same pit on the north side of the ballcourt with the female #1 variant discussed above (see Figure A4.10f). Significantly, a large ceramic effigy jaguar was also placed at the base of the pit before it was ritually closed (Feinman et al. 2016).

Figurines also are present in the smaller ballcourt that we excavated at El Palmillo; however, that assemblage is markedly different (see Tables A4.1 and A4.2). We excavated only a small part of that ballcourt, so the quantity of figurines recovered is not large. But of the 26 figurine fragments that were large enough to code, only one was a large, globular whistle fragment. Over 60% were molded warriors, most wearing cotton armor or feathered capes. Although most warrior figurines also served as whistles, their imagery does not match either the larger, globular whistles or the female figurines found in the pits adjacent to the Lambityeco ballcourt.

The ballcourt at Lambityeco was large, built earlier, and is located in the civic-ceremonial core of the site, like the main ballcourt at Monte Albán, whereas the smaller, later one at El Palmillo is ensconced between two elaborate residences just outside the site's public core (Feinman and Nicholas 2011a, 2019a). Toward the end of the Late Classic (ca. 800–900 CE), as Monte Albán began to decline, palaces became more central loci in local civic-ceremonial governance, and small ballcourts were often built adjacent to these high-status residences (Feinman and Nicholas 2011a, 2016a; Vera Estrada and García Wigueras 2014). Given the location and size of the ballcourt at El Palmillo and the presence of so many warrior figurines, the rituals enacted in these palace-linked courts likely carried a different meaning and message to a smaller number of specific attendees than at the earlier, larger ballcourts, such as at Lambityeco. In both cases, fired-clay figurines were integrated into nonresidential rituals, but seemingly for a different set of participants in distinct ways.

The spatial patterning of warrior figurines and differences in the distributions of specific warrior variants illustrate another axis of intraregional variation. Warrior figurines are relatively abundant at Classic period sites in eastern Tlacolula and the southern part of the valley but are seemingly rare at Monte Albán. Even though certain representations in headgear and garment are widespread, the most common warrior variant in Ejutla and Miahuatlán simply wears a loincloth, whereas warriors in cotton armor and feathered capes are much more common at the Tlacolula sites, including Lambityeco. Based on stratigraphic contexts, the warriors date slightly later in the sequence than most of the other Classic period figurine categories (Feinman and Nicholas 2015; Paddock 1983) and have been found to be more prevalent at sites distant from Monte Albán. The Mesoamerican ballgame has long been associated with militarism (e.g., Fox 1996; Kowalewski et al. 1991), and the presence of the later, smaller ballcourts adjacent to high-status residences, as at El Palmillo, may signal heightened intraregional competition at the end of the Classic period (Feinman and Nicholas 2016a). At that time, warrior and ballplayer figurines became more common across the region. If the presence of warrior figurines marks the breakaway of sites from Monte Albán's sphere of political hegemony after that central settlement began to decline at the end of the Classic period (Feinman and Nicholas 2016a, 54–56), then the observation that the warrior figurines in the southern part of the valley differ from those in the east is not that surprising. As Monte Albán declined and its political coalition fragmented, the eastern edge of the Valley of Oaxaca may have been part of a different political interaction sphere than Ejutla in the south, as clearly was the case later in the prehispanic era (Feinman and Nicholas 2013). Accordingly, the conventions of figurine representation may have diversified between the two valley sectors.

A4.5. Synthetic Thoughts

Through this analysis of the figurine assemblages from four Classic period sites in the Valley of Oaxaca, we have illustrated the utility of examining broad sets of figurines from a variety of contexts. Large quantities of broken figurines recovered from secondary and tertiary contexts can yield new vantages and information on patterns of behaviors associated with figurine use, especially when large assemblages from domestic and public areas at numerous sites are examined holistically.

We have advanced broad categories to organize key axes of variability for Classic period figurines from the prehispanic Valley of Oaxaca and have illustrated how those classes pattern distinctively between different sites and contexts. The distributions of the various classes of figurines are the behavioral remnants of activities that were enacted in those different contexts and likely were deposited close to where they were used (e.g., Beck 2003). Distributions of discrete categories of figurines and their relative abundances serve to distinguish the figurine assemblages in domestic contexts from the assemblages in public ritual and production contexts. We have also documented patterned variation across regional space for certain classes of figurines, a line of investigation that should be pursued further in future analyses of figurines at other sites in the valley.

Even though the use of molds for making figurines developed during the Classic period, a significant number of figurines continued to be modeled by hand. It is now clear that these small hand-formed figurines remained in use, mainly for domestic rituals, as they had been employed for more than a millennium. The new molded figurines appear to have been made in larger quantities for somewhat different purposes. Molded figurines wore decorated garments and feathers, which seemingly encoded and conveyed new classes of information. In Mesoamerica, figurines have long been considered mainly as objects for domestic ritual. Although some varieties continued to be used in household rituals during the Classic period, others were used in ceremonial activities that were enacted in public spaces. Based on our findings, fired-clay objects were utilized and consumed in significant quantities during these nondomestic ritual activities.

This analysis is only the first stage in our analytical investigation focused on Classic period figurines from the Valley of Oaxaca. Our intent is to generate feedback and encourage others to examine more holistically the production, use, discard, and diversity of figurines at other Oaxaca sites through a behavioral lens, rather than circumscribing discussion to the identification of potential representations or the enumeration of descriptive attributes. All those broken pieces of fired clay can be channeled to serve as an insightful vantage into the lives and activities of those who made and used them (Skibo 1999, 1). More specifically, this comparative examination has allowed us to outline several key general themes that transcend the fired-clay figures from any solitary site to the entire Central Valleys of Oaxaca. At the same time, precise details and particular representations varied in frequency across the same sample.

Appendix 5a

Broken Shell Categories at Ejutla by Genus

Bivalves					
Genus	**Hinge**	**Margin**	**Wall fragment**	**Unidentified**	**Total**
Anadara	5	30	6	47	88
Anomia	–	–	–	–	–
Arca	3	–	–	–	3
Barbatia	–	–	–	1	1
Chama	96	92	2	162	352
Chione	–	–	–	1	1
Codakia	–	1	–	–	1
Donax	–	1	–	–	1
Glycymeris	2	–	1	–	3
Heterodonax	–	–	–	–	–
Lucina	–	–	–	–	–
nacreous/*Pinctada*	1754	21	16	3024	4815
Ostrea	–	1	2	2	5
Pecten	–	3	–	–	3
pelecypod UID	51	59	6	172	288
Periglypta	–	2	–	–	2
Pinctada	407	5	12	589	1013
Pitar	–	3	1	–	4
Protothaca	–	–	–	1	1
Pteria	1	–	–	–	1
Semele	1	–	–	–	1
Solamen	–	–	–	–	–
Spondylus	11	5	–	56	72
Tellina	–	2	–	–	2
Tivela	–	1	–	–	1
Trachycardium	1	1	1	5	8
Total bivalves	2332	227	47	4060	6666

Gastropods						
Genus	**Columella**	**Spire**	**Margin**	**Wall fragment**	**Unidentified**	**Total**
Acmaea	–	6	28	–	1	35
Agaronia	2	–	–	–	–	2
Astraea	–	–	5	–	–	5
Calliostoma	–	1	–	–	–	1
Cancellaria	–	2	–	–	–	2
Cassis	2	6	–	–	2	10
Cerithidea	–	–	–	–	1	1
Cerithium	–	–	–	–	–	–
Conus	1	1	–	–	–	2
Cypraea	–	–	2	–	–	2
Ficus	1	1	5	5	1	13

(*Continued*)

Genus	Columella	Spire	Margin	Wall fragment	Unidentified	Total
Fissurella	–	–	3	–	2	5
gastropod UID	3347	354	67	1153	925	5846
Haliotis	–	–	3	2	2	7
Janthina	–	–	–	–	–	–
Jenneria	–	–	1	–	–	1
Lamellaria	–	–	–	–	–	–
limpet UID	–	–	–	–	1	1
Littorina	–	–	–	–	–	–
Malea	–	4	–	–	–	4
Marginella	–	–	–	–	–	–
matte white UID	2	–	1	–	–	3
Mitra	–	–	–	–	–	–
Mitrella	–	–	–	–	–	–
Morum	–	–	1	–	–	1
Nassarius	–	–	–	–	–	–
Natica	–	–	–	1	–	1
Oliva	9	8	4	–	5	26
Olivella	–	2	–	–	–	2
Patella	–	3	24	1	183	211
Persicula	–	–	1	–	–	1
Petaloconchus	–	–	–	–	7	7
Polinices	–	1	–	–	–	1
Purpura	–	1	–	–	–	1
Pyrene	–	–	–	–	–	–
Strombus	89	20	23	5	6	143
Tegula	–	–	–	–	–	–
Thais	1	–	–	–	–	1
Trivia	–	–	1	–	–	1
Turritella	–	–	–	1	–	1
Total gastropods	3454	410	169	1168	1136	6337

Unidentified				
Genus	**Margin**	**Wall fragment**	**Unidentified**	**Total**
UID	13	8	2298	2319

Appendix 5b

Worked Shell Categories at Ejutla by Genus

Bivalves											
Genus	**1 string-cut edge**	**2 string-cut edges**	**1 cut edge**	**2 cut edges**	**3 cut edges**	**Surficial cut marks**	**Drill marks**	**Round cut edges**	**Roughly cut edges**	**Abraded edges**	**Roughed-out blanks**
Anadara	–	–	–	–	–	–	–	–	–	–	–
Anomia	–	–	–	–	–	–	–	–	–	–	–
Arca	–	–	–	–	–	–	–	–	–	–	–
Barbatia	–	–	–	–	–	–	–	–	–	–	–
Chama	–	–	11	1	–	2	3	1	–	1	–
Chione	–	–	–	–	–	–	–	–	–	–	–
Codakia	–	–	–	–	–	–	–	–	–	–	–
Donax	–	–	–	–	–	–	–	–	–	–	–
Glycymeris	–	–	–	–	–	–	–	–	–	–	–
Heterodonax	–	–	–	–	–	–	–	–	–	–	–
Lucina	–	–	–	–	–	–	–	–	–	–	–
nacreous/*Pinctada*	8	–	1690	2468	1	14	12	200	–	262	537
Ostrea	–	–	1	–	–	–	–	–	–	–	7
Pecten	–	–	–	–	–	–	–	–	–	–	–
pelecypod UID	2	–	18	19	1	1	–	2	–	1	–
Periglypta	–	–	–	–	–	–	–	–	–	–	–
Pinctada	8	1	451	842	2	16	–	66	–	41	551
Pitar	–	–	–	–	–	–	–	–	–	–	–
Protothaca	–	–	–	–	–	–	–	–	–	–	–
Pteria	–	–	–	–	–	–	–	–	–	–	–
Semele	–	–	–	–	–	–	–	–	–	–	–
Solamen	–	–	–	–	–	–	–	–	–	–	–
Spondylus	11	16	18	18	3	4	–	–	2	2	–
Tellina	–	–	–	–	–	–	–	–	–	–	–
Tivela	–	–	–	–	–	–	–	–	–	–	–
Trachycardium	–	–	–	–	–	–	–	–	–	–	–
Total bivalves	29	17	2189	3348	7	37	15	269	2	307	1095

(*Continued*)

Gastropods											
Genus	**1 string cut edge**	**2 string cut edges**	**1 cut edge**	**2 cut edges**	**3 cut edges**	**Surficial cut marks**	**Drill marks**	**Round cut edges**	**Roughly cut edges**	**Abraded edges**	**Roughed out blanks**
Acmaea	–	–	1	–	–	–	–	–	–	–	–
Agaronia	1	–	–	–	–	–	–	–	–	–	–
Astraea	–	–	2	–	–	–	–	–	–	–	–
Calliostoma	–	–	–	–	–	–	–	–	–	–	–
Cancellaria	–	–	–	–	–	–	–	–	–	–	–
Cassis	1	–	–	–	–	–	–	–	–	–	–
Cerithidea	–	–	–	–	–	–	–	–	–	–	–
Cerithium	–	–	–	–	–	–	–	–	–	–	–
Conus	–	–	–	–	–	–	–	–	–	–	–
Cypraea	–	–	–	–	–	1	–	–	–	–	–
Ficus	5	6	3	1	1	–	–	–	–	–	–
Fissurella	–	–	–	–	–	–	–	–	–	–	–
gastropod UID	151	63	121	100	21	54	5	6	46	120	14
Haliotis	1	1	1	3	–	–	–	–	–	–	–
Janthina	–	–	–	–	–	–	–	–	–	–	–
Jenneria	–	–	–	–	–	–	–	–	–	–	–
Lamellaria	–	–	–	–	–	–	–	–	–	–	–
limpet UID	–	–	–	–	–	–	–	–	–	–	–
Littorina	–	–	–	–	–	–	–	–	–	–	–
Malea	–	–	2	–	–	–	–	–	–	–	–
Marginella	–	–	–	–	–	–	–	–	–	–	–
matte white UID	–	–	2	3	–	2	–	–	–	1	–
Mitra	–	–	–	–	–	–	–	–	–	–	–
Mitrella	–	–	–	–	–	–	–	–	–	–	–
Morum	–	–	–	–	–	–	–	–	–	–	–
Nassarius	–	–	–	–	–	–	–	–	–	–	–
Natica	–	–	–	–	–	–	–	–	–	–	–
Oliva	–	–	1	–	1	–	3	–	–	–	–
Olivella	–	–	–	–	–	–	–	–	–	–	–
Patella	3	4	100	78	–	6	–	1	–	7	23
Persicula	–	–	–	–	–	–	–	–	–	–	–

Gastropods											
Genus	**1 string cut edge**	**2 string cut edges**	**1 cut edge**	**2 cut edges**	**3 cut edges**	**Surficial cut marks**	**Drill marks**	**Round cut edges**	**Roughly cut edges**	**Abraded edges**	**Roughed out blanks**
Petaloconchus	–	–	–	–	–	–	–	–	–	–	–
Polinices	–	–	–	–	–	–	–	–	–	–	–
Purpura	–	–	–	–	–	–	–	–	–	–	–
Pyrene	–	–	–	–	–	–	–	–	–	–	–
Strombus	5	12	21	6	2	2	–	–	5	1	–
Tegula	–	–	–	–	–	–	–	–	–	–	–
Thais	–	–	1	–	–	–	–	–	–	–	–
Trivia	–	–	–	–	–	–	–	–	–	–	–
Turritella	–	–	–	–	–	–	–	–	–	–	–
Total gastropods	167	86	255	191	25	65	8	7	51	129	37

Unidentified											
Genus	**1 string-cut edge**	**2 string-cut edges**	**1 cut edge**	**2 cut edges**	**3 cut edges**	**Surficial cut marks**	**Drill marks**	**Round cut edges**	**Roughly cut edges**	**Abraded edges**	**Roughed-out blanks**
UID	14	10	172	44	1	13	3	3	–	3	–

Appendix 6

Finished Shell Ornaments at Ejutla

Context	Class	Family	Genus	Species	Ornament category	Ornament form	Morphology	Condition	Perforation	Perforation type	Thickness/ height (mm)	Width (mm)	Length (mm)	Diameter (mm)	Hole diameter (mm)	Weight (g)
plow zone	Gastropoda	Gastropoda UID	–	–	bead	?	shaped	whole	complete	?				0.6		
house floor	Bivalvia	Chamidae	*Chama*?	sp.	bead	cylindrical	shaped	whole	complete	biconical	2.4			6.0	1.9	0.1
house floor	Bivalvia	Chamidae	*Chama*?	sp.	bead	cylindrical	shaped	partial	complete	biconical	3.9			7.0	2.7	0.1
fill/midden below house	Gastropoda	Gastropoda UID	–	–	bead	cylindrical	shaped	whole	complete	biconical	2.3			5.5	2.2	0.1
house floor pavement	Bivalvia	Chamidae	*Chama*	*echinata*?	bead	cylindrical	shaped	whole	complete	biconical	3.9			6.4	2.8	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	cylindrical	shaped	whole	complete	biconical	2.4			5.0	1.2	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	cylindrical	shaped	whole	complete	biconical	2.6			5.8	1.4	0.2
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	bead	cylindrical	shaped	whole	complete	biconical	2.9			5.0	1.7	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	cylindrical	shaped	whole	complete	biconical	2.6			5.2	1.4	0.2
midden upper (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	cylindrical	shaped	whole	complete	conical	2.6			6.8	2.3	0.4
midden upper (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	cylindrical	shaped	whole	complete	biconical	4.2			6.2	1.3	0.1
surface	Gastropoda	Gastropoda UID	matte white UID	–	bead	cylindrical	shaped	whole	complete	?	5.0			9.0	3.0	
surface SE	Gastropoda	Gastropoda UID	matte white UID	–	bead	cylindrical	shaped	partial	complete	biconical	8.0			10.0		
surface SE	Gastropoda	Gastropoda UID	matte white UID	–	bead	cylindrical	shaped	partial	complete	biconical	5.0			9.0		
midden above house	Gastropoda	Gastropoda UID	–	–	bead	cylindrical?	shaped	partial	complete	biconical	4.5			6.0	1.6	0.1
house floor	Gastropoda	Olividae	*Oliva*	*porphyria*?	bead	disk bead	shaped	whole	complete	conical	1.6			9.6	2.8	0.2
house floor pavement	Bivalvia	Chamidae	*Chama*?	sp.	bead	disk bead	shaped	whole	complete	conical	3.7			10.0	2.1	0.5
midden above house	UID	UID	–	–	bead	disk bead	shaped	partial	complete	?	3.7			9.5	4.1	0.3

(*Continued*)

Context	Class	Family	Genus	Species	Ornament category	Ornament form	Morphology	Condition	Perforation	Perforation type	Thickness/ height (mm)	Width (mm)	Length (mm)	Diameter (mm)	Hole diameter (mm)	Weight (g)
plow zone	Bivalvia	Chamidae	*Chama*?	*echinata*?	bead	disk bead	shaped	partial	complete	biconical	1.9			6.4	1.2	0.1
midden upper (#2)	Gastropoda	Gastropoda UID	–	–	bead	disk bead	shaped	whole	complete	biconical	2.5			5.6	2.2	0.1
midden upper (#2)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	drilled	whole	complete	conical	1.5			10.5	1.6	0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	drilled	partial	complete	?	0.7			12.0	3.5	0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	drilled	partial	complete	?	1.1			15.0		0.3
midden upper (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	disk bead	shaped	whole	complete	biconical	3.8			7.6	2.2	0.7
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	shaped	whole	complete	?	0.7			10.0	3.5	0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	shaped	partial	complete	?	1.1			14.8	4.2	0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	shaped	partial	complete	?	0.7			11.4	3.8	0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	drilled	partial	complete	?	1.2			13.0	3.5	0.4
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	drilled	partial	complete	?	0.8			10.5	2.5	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	bead	disk bead	shaped	whole	complete	biconical	2.4			7.3	1.5	0.3
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	shaped	whole	complete	biconical	1.1			10.8	3.5	0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	drilled	partial	partial	?	0.9			12.0	4.2	0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	shaped	whole	complete	conical	0.8			9.3	3.3	0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	drilled	partial	complete	conical	0.9			10.6	3.8	0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	shaped	partial	complete	?	0.7			11.2	3.6	0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	shaped	partial	complete	?	1.1			13.2	3.4	0.1
surface south	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		bead	disk bead	shaped	whole	complete	?	1.0			16.0	3.5	0.5
mixed	Gastropoda	Gastropoda UID	–	–	bead	miniature	shaped	whole	complete	biconical	3.0			5.0	2.1	0.1

Context	Class	Family	Genus	Species	Ornament category	Ornament form	Morphology	Condition	Perforation	Perforation type	Thickness/ height (mm)	Width (mm)	Length (mm)	Diameter (mm)	Hole diameter (mm)	Weight (g)
midden above house	UID	UID	–	–	bead	miniature	shaped	whole	complete	biconical	2.9			4.6	2.1	0.1
fill/midden below house	Bivalvia	Bivalvia UID	–	–	bead	miniature	shaped	whole	complete	biconical	3.3			4.7	2.0	0.1
fill/midden below house	Gastropoda	Gastropoda UID	–	–	bead	miniature	shaped	whole	complete	biconical	2.3			4.6	1.8	0.1
fill/midden below house	Bivalvia	Chamidae	*Chama*	*echinata*?	bead	miniature	shaped	whole	complete	conical	0.7			4.5	1.0	0.1
lower midden (#2)	Gastropoda	Gastropoda UID	–	–	bead	miniature	shaped	partial	complete	biconical	1.9			5.0	2.2	0.1
lower midden (#2)	UID	UID	–	–	bead	miniature	shaped	partial	complete	biconical	1.8			4.8	1.6	0.4
midden upper (#2)	UID	UID	–	–	bead	miniature	shaped	whole	complete	conical	2.0			4.3	1.7	0.1
midden upper (#4)	Bivalvia	Spondylidae	*Spondylus*	sp.	bead	miniature	shaped	whole	complete	biconical	2.8			4.4	1.3	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	miniature	shaped	whole	complete	biconical	1.8			4.5	1.6	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	bead	miniature	shaped	whole	complete	biconical	3.2			4.5	1.5	0.2
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	bead	miniature	shaped	whole	complete	conical?	2.0			4.1	1.3	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	bead	miniature	shaped	whole	complete	biconical	1.7			3.6	1.4	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	bead	miniature	shaped	whole	complete	biconical	2.5			4.6	1.7	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	miniature	shaped	whole	complete	biconical	1.9			4.0	1.2	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	bead	miniature	shaped	whole	complete	biconical	2.5			4.5	1.5	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	miniature	shaped	whole	complete	biconical	1.8			4.6	1.6	0.2
lower midden (#4)	Bivalvia	Spondylidae	*Spondylus*	*princeps*	bead	miniature	shaped	whole	complete	biconical	1.9			4.0	1.3	0.1
lower midden (#4)	UID	UID	–	–	bead	miniature	shaped	whole	complete	biconical	1.6			4.5	1.2	0.1
lower midden (#4)	Bivalvia	Spondylidae	*Spondylus*	*princeps*	bead	miniature	shaped	whole	complete	biconical	2.5			5.0	1.4	0.1

(*Continued*)

Context	Class	Family	Genus	Species	Ornament category	Ornament form	Morphology	Condition	Perforation	Perforation type	Thickness/ height (mm)	Width (mm)	Length (mm)	Diameter (mm)	Hole diameter (mm)	Weight (g)
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	bead	miniature	shaped	whole	complete	?	2.2			4.7	1.7	0.1
midden upper (#4)	UID	UID	–	–	bead	miniature	shaped	whole	complete	biconical	2.2			5.8	1.5	0.1
midden upper (#4)	Bivalvia	Spondylidae	*Spondylus*	sp.	bead	miniature	shaped	partial	complete?	?	2.6			6.1		0.1
surface SE	UID	UID	–	–	bead	miniature	shaped	partial	complete	?	2.0			5.0		
house floor	UID	UID	–	–	bead	spherical	shaped	whole	complete	biconical	3.6			5.3	2.4	0.1
house floor	UID	UID	–	–	bead	spherical	shaped	partial	complete	biconical	4.3			5.3	2.1	0.1
midden above house	Gastropoda	Gastropoda UID	–	–	bead	spherical	shaped	whole	complete	biconical	8.7			9.8	3.2	1.3
midden upper (#2)	Gastropoda	Gastropoda UID	matte white UID	–	bead	spherical	shaped	whole	complete	biconical	4.2			5.7	2.1	0.1
midden upper (#2)	Gastropoda	Gastropoda UID	matte white UID	–	bead	spherical	shaped	partial	complete	biconical	3.1			6.2	2.2	0.1
lower midden (#2)	Gastropoda	Gastropoda UID	–	–	bead	spherical	shaped	partial	complete	biconical	3.3			5.4	2.0	0.1
lower midden (#2)	UID	UID	–	–	bead	spherical	shaped	partial	complete	biconical	3.7	`		5.5	2.2	0.1
midden upper (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	spherical	shaped	whole	complete	biconical	4.1			5.7	2.1	0.2
lower midden (#4)	Gastropoda	Gastropoda UID	matte white UID	–	bead	spherical	shaped	whole	complete	biconical	6.0			8.5	2.4	0.7
plow zone	Gastropoda	Gastropoda UID	matte white UID	–	bead	spherical	shaped	whole	complete	biconical	3.0			5.0	2.0	0.2
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	bead	spherical	shaped	whole	complete	?	10.0			8.0	5.0	0.8
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	bead	spherical	shaped	partial	complete	?	4.5			5.8	1.8	0.1
surface north area	Gastropoda	Gastropoda UID	–	–	bead	spherical	shaped	whole	complete	biconical	5.9	6.8			0.2	
midden above house	Bivalvia	Spondylidae	*Spondylus*?	sp.	bead	tubular	shaped	whole	complete	biconical	9.9			4.0	1.8	0.1
house floor pavement	Gastropoda	Gastropoda UID	–	–	bead	tubular	shaped	partial	complete	biconical	10.1			5.0	2.7	0.2
midden upper (#4)	Bivalvia	Spondylidae	*Spondylus*	sp.	bead	tubular	shaped	partial	partial	biconical	2.4			3.1	1.9	0.1
midden upper (#4)	UID	UID	–	–	bead	tubular	shaped	partial	complete	biconical	11.2			3.9		0.1

Context	Class	Family	Genus	Species	Ornament category	Ornament form	Morphology	Condition	Perforation	Perforation type	Thickness/ height (mm)	Width (mm)	Length (mm)	Diameter (mm)	Hole diameter (mm)	Weight (g)
house floor pavement	Gastropoda	Muricidae	*Thais*	*triangularis*	bead	whole shell	natural	whole	complete	punched	8.2	13.1	15.3			0.9
house floor pavement	Gastropoda	Muricidae	*Thais*	*triangularis*	bead	whole shell	natural	whole	complete	punched	7.7	11.0	14.1			0.8
house floor pavement	Gastropoda	Muricidae	*Thais*	*triangularis*	bead	whole shell	natural	whole	complete	punched	7.9	12.8	15.1			1.1
house floor pavement	Gastropoda	Muricidae	*Thais*	*triangularis*	bead	whole shell	natural	whole	complete	punched	7.0	10.6	13.4			0.6
house floor pavement	Gastropoda	Muricidae	*Thais*	*triangularis*	bead	whole shell	natural	whole	complete	punched	7.1	10.8	14.0			0.6
house floor pavement	Gastropoda	Muricidae	*Thais*	*triangularis*	bead	whole shell	natural	whole	complete	punched	6.9	10.2	12.7			0.6
midden upper (#2)	Gastropoda	Muricidae	*Thais*	*triangularis*	bead	whole shell	natural	partial	none	–	15.5					
lower midden (#2)	Gastropoda	Muricidae	*Thais*	*triangularis*	bead	whole shell	natural	whole	complete	punched	9.6	14.6	17.9			1.2
midden upper (#4)	Gastropoda	Marginellidae	*Marginella*	*apicina*	bead	whole shell	natural	partial	complete	cut spire	8.3	4.7	8.3			0.1
fill/midden below house	Bivalvia	Arcidae UID	–	–	bracelet	curved fragment	shaped	partial	none	–	2.1	6.3				0.6
fill/midden below house	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	bracelet	curved fragment	shaped	partial	none	–	0.6	4.9	14.3			0.1
fill/midden below house	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	bracelet	curved fragment	shaped	partial	none	–	1.3	4.2				0.4
house floor	Bivalvia	Bivalvia UID	–	–	bracelet	curved fragment	shaped	partial	none	–	3.2	10.5	24.1			1.4
midden house exterior	Gastropoda	Strombidae	gastropod UID	*conch shell*	bracelet	curved fragment	shaped	partial	none	–	2.2	5.1				0.4
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	bracelet	curved fragment	shaped	partial	none	–	4.7	18.0	43.0			4.9
surface south	Gastropoda	Patellidae	*Patella*	*mexicana*	bracelet	curved fragment	shaped	partial	none	–	6.0	5.0	50.0			
midden upper (#4)	Gastropoda	Gastropoda UID	–	–	other/ unknown	tubular	shaped	whole	none	–	2.9	4.0	14.6			0.3
midden upper (#4)	Bivalvia	Spondylidae	*Spondylus*	*princeps*?	pendant	?	shaped	partial	complete	?		3.7	4.5			0.1
midden upper (#4)	UID	UID	–	–	pendant	?	shaped	partial	complete?	?	3.0					

(*Continued*)

Context	Class	Family	Genus	Species	Ornament category	Ornament form	Morphology	Condition	Perforation	Perforation type	Thickness/ height (mm)	Width (mm)	Length (mm)	Diameter (mm)	Hole diameter (mm)	Weight (g)
midden above house	Bivalvia	Spondylidae	*Spondylus*	sp.	pendant	circular pendant	shaped	whole	complete	biconical	5.6	18.8	20.3		3.0	2.7
midden upper (#2)	UID	UID	–	–	pendant	circular pendant	shaped	whole	complete	conical	1.6			11.5		0.3
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		pendant	circular pendant	shaped	whole	complete	conical	1.7	11.4	17.0			0.6
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	pendant	circular pendant	shaped	partial	complete?	?	2.0	16.0	16.0			1.0
house floor	Gastropoda	Olividae	Olividae UID	–	pendant	flower	natural	whole	complete	cut spire	5.3	9.6	10.5			0.2
fill/midden below house	UID	UID	–	–	pendant	hourglass	shaped	partial	complete	biconical	4.5	5.0	13.4			0.4
pit kiln 3	Gastropoda	Gastropoda UID	–	–	pendant	lunate	shaped	whole	complete	conical	1.2	7.7	24.2		2.0	0.3
house floor	Gastropoda	Gastropoda UID	–	–	pendant	monkey/ snake	shaped	partial	complete	conical	2.1	12.7	14.0			0.5
plow zone	Bivalvia	Spondylidae	*Spondylus*	*princeps*?	pendant	oval	shaped	partial	complete	biconical	3.7	6.0	10.7		1.2	0.3
surface SE	Gastropoda	Olividae	*Oliva*	*porphyria*	pendant	oval	shaped	partial	complete	conical						
surface south	UID	UID	–	–	pendant	oval	shaped	whole	complete	conical	2.5	3.4	7.3		1.5	0.1
midden upper (#4)	Bivalvia	Spondylidae	*Spondylus*	*princeps*	pendant	tabular irreg	shaped	partial	complete	conical	1.2	5.6	11.7		1.1	0.2
house floor?	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	pendant	tabular rectangle	shaped	whole	complete	conical	2.5	12.2	22.0			0.7
top of pit kiln 2	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	pendant	tabular rectangle	shaped	partial	complete	biconical	2.0	3.9	20.0			0.2
pit kiln 3	Gastropoda	Gastropoda UID	–	–	pendant	tabular rectangle	shaped	partial	complete	biconical	2.5	4.7	36.0		1.7	1.0
surface SW	Gastropoda	Gastropoda UID	–	–	pendant	tabular trapezoid	shaped	partial	complete	?						
midden above house	Gastropoda	Gastropoda UID	–	–	pendant	teardrop	shaped	whole	complete	biconical	4.3	5.4	18.4		1.9	0.6
midden upper (#2)	Gastropoda	Gastropoda UID	–	–	pendant	teardrop	shaped	partial	complete	biconical	6.7	6.2	8.8			0.2
midden upper (#4)	UID	UID	–	–	pendant	teardrop	shaped	whole	complete	biconical	3.2	6.8	7.8			0.2
fill/midden below house	Gastropoda	Potamididae	*Cerithidea*	*albonodosa*	pendant	whole shell	natural	whole	complete	punched	6.8	8.7	21.9			0.3
fill/midden below house	Gastropoda	Ovulidae	*Jenneria*	*pustulata*	pendant	whole shell	natural	whole	none	?						

Context	Class	Family	Genus	Species	Ornament category	Ornament form	Morphology	Condition	Perforation	Perforation type	Thickness/ height (mm)	Width (mm)	Length (mm)	Diameter (mm)	Hole diameter (mm)	Weight (g)
house floor	Gastropoda	Olividae	*Oliva*	*porphyria*	pendant	whole shell	shaped	whole	complete	string cut	19.6	23.7	36.3			10.6
fill/midden below house	Bivalvia	Chamidae	*Chama?*	sp.	pendant	whole shell	natural	partial	complete	conical	4.9	17.5	20.8			1.0
pit kiln 2	Gastropoda	Olividae	*Agaronia*	*testacea*	pendant	whole shell	natural	whole	complete	punched	8.8	11.3	22.8			1.1
midden upper (#4)	Gastropoda	Ovulidae	*Jenneria*	*pustulata*	pendant	whole shell	natural	whole	complete, near top	punched	6.5	10.0	15.7			0.5
lower midden (#4)	Bivalvia	Anomiidae	*Anomia*	*adamas*?	pendant	whole shell	natural	partial	complete	conical	3.5	3.5	12.5			0.3
midden upper (#4)	Gastropoda	Acmaeidae	*Acmaea*	*pediculus*?	pendant	whole shell	natural	partial	complete	?	7.0	21.5	26.7			1.0
surface SE	UID	UID	–	–	placa	?	shaped	partial	complete?	?						
midden upper (#2)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	crescent	shaped	whole	complete	?	0.7	8.4	13.1			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	diamond	shaped	whole	none	–	1.1	14.2	15.0			0.1
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	diamond	shaped	whole	none	–	0.4	2.0	3.5			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	diamond	shaped	whole	none	–	4.6	12.7	30.5			2.0
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	irregular	shaped	whole	none	–	2.2	6.8	13.8			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	irregular	shaped	whole	none	–	1.2	8.1	23.1			0.4
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	lunate	shaped	whole	none	–	1.1	3.8	15.6			0.3
lower midden (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	number 7	shaped	whole	none	–	1.7	12.4	21.1			0.6
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	pentagonal	shaped	whole	none	–	1.5	11.6	13.0			0.2
surface south	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	pentagonal	shaped	whole	none	–	2.4	12.4	16.5			0.7
house floor?	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	rectangular	shaped	partial	none	–	1.5	6.3	16.9			0.2
midden above house	Gastropoda	Gastropoda UID	–	–	placa	rectangular	shaped	whole	none	–	1.9	10.1	16.2			0.6
house exterior midden	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	1.6	8.3	10.8			0.2
top of pit kiln 2	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	rectangular	shaped	partial	none	–	1.5	3.9	17.8			0.2
midden upper (#2)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	1.2	6.1	10.4			0.2

(*Continued*)

Context	Class	Family	Genus	Species	Ornament category	Ornament form	Morphology	Condition	Perforation	Perforation type	Thickness/ height (mm)	Width (mm)	Length (mm)	Diameter (mm)	Hole diameter (mm)	Weight (g)
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	rectangular	shaped	whole	none	–	2.1	3.5	12.6			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	partial	none	–	0.8	6.7	12.2			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	1.2	4.2	9.4			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	2.0	6.0	9.0			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	partial	none	–	4.7	21.0	31.0			5.5
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	rectangular	shaped	whole	none	–	1.7	6.7	10.0			0.2
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	rectangular	shaped	whole	none	–	4.2	9.7	19.0			1.3
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	1.4	5.0	8.5			0.1
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	rectangular	shaped	whole	none	–	0.8	7.0	9.1			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	1.3	7.1	9.4			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	partial	none	–	2.0	9.0	12.5			0.3
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	rectangular	shaped	whole	none	–	3.1	10.0	13.6			0.9
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	rectangular	shaped	whole	none	–	1.2	6.0	9.7			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	0.8	5.0	9.5			0.1
midden upper (#4)	Gastropoda	Haliotidae	*Haliotis*	*fulgens*?	placa	rectangular	shaped	whole	none	–	2.1	6.3	16.5			0.4
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	0.8	4.3	7.7			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	1.6	3.4	16.7			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	1.3	5.1	10.7			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	0.7	7.7	17.7			0.1
surface south	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	rectangular	shaped	whole	none	–	2.0	6.5	19.5			0.7

Context	Class	Family	Genus	Species	Ornament category	Ornament form	Morphology	Condition	Perforation	Perforation type	Thickness/ height (mm)	Width (mm)	Length (mm)	Diameter (mm)	Hole diameter (mm)	Weight (g)
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	spade-like	shaped	whole	none	–	3.0	11.9	23.8			0.8
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	square	shaped	whole	none	–	1.7	7.3	8.4			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	square	shaped	whole	none	–	1.5	7.0	9.3			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	square	shaped	whole	none	–	1.7	9.8	11.3			0.5
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	square	shaped	whole	none	–	1.2	7.0	7.5			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	square	shaped	whole	none	–	2.1	10.0	14.0			0.4
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	square	shaped	whole	none	–	0.5	5.0	6.0			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	trapezoid	shaped	whole	none	–	3.2	12.0	18.6			1.7
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	trapezoid	shaped	whole	none	–	1.8	24.4	26.2			2.6
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	trapezoid	shaped	whole	none	–	2.2	11.0	17.0			0.7
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	trapezoid	shaped	whole	none	–	2.3	6.2	9.5			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	2.0	13.3	15.7			0.7
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	2.1	8.5	8.2			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	1.2	10.2	18.8			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	2.3	7.8	10.8			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	0.8	4.0	12.9			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	1.4	8.4	8.6			0.1
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	partial	none	–	0.5	6.4	11.4			0.1
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	triangular	shaped	whole	none	–	1.3	9.5	13.0			0.2

(*Continued*)

Context	Class	Family	Genus	Species	Ornament category	Ornament form	Morphology	Condition	Perforation	Perforation type	Thickness/ height (mm)	Width (mm)	Length (mm)	Diameter (mm)	Hole diameter (mm)	Weight (g)
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	triangular	shaped	whole	none	–	3.6	22.9	21.9			1.9
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	1.7	7.3	11.9			0.1
midden upper (#4)	Gastropoda	Haliotidae	*Haliotis*	*fulgens*	placa	triangular	shaped	whole	none	–	1.3	11.3	10.5			0.1
lower midden (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	1.5	8.2	12.0			0.1
lower midden (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	1.8	11.7	10.6			0.1
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	triangular	shaped	whole	none	–	1.9	6.6	8.9			0.1
midden upper (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	triangular	shaped	whole	none	–	3.0	15.2	23.5			1.7
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	0.8	6.7	7.7			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	1.8	6.2	8.5			0.2
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	0.6	6.0	9.1			0.1
lower midden (#4)	Bivalvia	Pteriidae	*Pinctada*	*mazatlanica*	placa	triangular	shaped	whole	none	–	1.5	10.8	14.4			0.3
lower midden (#4)	UID	UID	–	–	placa	triangular	shaped	whole	none	–		8.0	10.0			
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	3.1	9.3	7.3			0.3
midden upper (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	1.6	6.7	13.6			0.1
lower midden (#4)	Bivalvia	Bivalvia UID	nacreous/ *Pinctada*		placa	triangular	shaped	whole	none	–	1.0	10.9	12.9			0.2

Appendix 7

The Shell Assemblage at Monte Albán by Project

Proyecto Especial de Monte Albán 1992–94 (non-shell-working areas)						
Genus	**Broken shell**	**Worked shell**	**Unmodified whole shell**	**Unfinished ornament**	**Finished ornament**	**Total**
Bivalves	**386**	**155**	**64**	**100**	**271**	**976**
Anadara	2	2	–	–	–	4
Barbatia (?)	1	–	–	–	–	1
Chama	139	19	59	1	4	222
Chama (?)	31	–	–	1	–	32
Donax	5	–	2	–	–	7
Donax (?)	1	–	–	–	–	1
Glycymeris	–	–	–	–	2	2
Glycymeris (?)	–	–	–	–	1	1
Lophocardium (?)	1	–	–	–	–	1
Lucina	1	–	–	–	–	1
Mactrellona	1	–	–	–	–	1
nacreous/*Pinctada*	93	77	–	55	118	343
Ostrea	–	–	2	–	–	2
Ostrea (?)	1	–	–	–	–	1
pelecypod UID	40	6	–	1	3	50
Periglypta	–	1	–	–	–	1
Pinctada	14	19	–	16	108	157
Pinctada (?)	10	16	–	15	15	56
Pitar	1	–	1	–	–	2
Polymesoda (?)	1	–	–	–	–	1
Protothaca	1	–	–	–	–	1
Pteria (?)	1	–	–	1	–	2
Sanguinolaria	1	–	–	–	–	1
Spondylus	30	12	–	9	17	68
Spondylus (?)	5	2	–	1	2	10
Spondylus/Chama	1	–	–	–	–	1
Tellina	2	–	–	–	–	2
Tellina (?)	1	1	–	–	–	2
Tivela	–	–	–	–	1	1
Tivela (?)	1	–	–	–	–	1
Trachycardium	1	–	–	–	–	1
Bivalve (freshwater)	**–**	**1**	**–**	**–**	**–**	**1**
Margaritifera	–	1	–	–	–	1
Gastropods	**162**	**37**	**61**	**41**	**198**	**499**
Acmaea	–	1	3	–	–	4
Acmaea (?)	1	–	1	–	–	2
Agaronia	1	1	–	–	3	5
Agaronia (?)	1	–	–	1	1	3
Agaronia/Oliva	–	1	–	–	1	2

(*Continued*)

Genus	Broken shell	Worked shell	Unmodified whole shell	Unfinished ornament	Finished ornament	Total
Agaronia/Olivella	–	–	–	–	1	1
Astraea	3	–	–	–	–	3
Astraea (?)	1	1	–	–	–	2
Cassis (?)	2	–	–	–	–	2
Cerithidea	–	–	1	–	2	3
Cerithidea (?)	–	–	1	–	–	1
Cerithium	1	–	2	–	–	3
Conus	1	2	–	3	1	7
Conus (?)	1	–	–	–	–	1
Conus/Oliva	–	1	–	–	–	1
Crepidula	–	–	1	–	–	1
Crucibulum	2	–	3	–	–	5
Cymatium	2	–	–	–	–	2
Cypraea	7	–	–	1	1	9
Diodora	–	–	1	–	1	2
Diodora (?)	–	–	1	–	–	1
Engina	–	–	–	–	1	1
Fissurella	2	–	5	–	3	10
Fissurella (?)	1	–	–	–	1	2
Fossarus	–	–	1	–	–	1
Fusinus	–	1	–	–	–	1
gastropod UID	61	14	–	18	35	128
Haliotis	–	2	–	–	–	2
Hexaplex (?)	–	–	–	–	1	1
Jenneria	1	–	–	–	1	2
Latirus	1	–	2	–	1	4
limpet (?)	1	–	–	–	–	1
Littorina	–	–	1	–	–	1
Malea	1	–	–	–	–	1
Marginella	–	–	3	–	15	18
Mitrella	1	–	1	–	8	10
Mitrella (?)	–	–	–	–	1	1
Morum	1	–	–	–	4	5
Muricanthus	2	–	–	–	–	2
Nassarius	–	–	1	–	–	1
Natica (?)	–	–	–	–	1	1
Nerita	–	–	–	1	–	1
Neritina	–	–	6	–	1	7
Oliva	26	7	2	7	37	79
Oliva (?)	4	–	–	–	3	7
Olivella	4	1	3	–	58	66
Olivella (?)	3	–	–	–	1	4
Patella	–	1	–	1	–	2
Patella (?)	–	–	–	2	1	3
Persicula	–	–	–	–	2	2
Petaloconchus	1	–	–	–	–	1
Planaxis	–	–	1	–	–	1
Pyrene	3	–	1	–	4	8

Genus	Broken shell	Worked shell	Unmodified whole shell	Unfinished ornament	Finished ornament	Total
Siphonaria (?)	–	–	1	–	–	1
Strombus	–	3	1	5	–	9
Strombus (?)	–	1	–	–	–	1
Tegula	1	–	–	–	–	1
Terebra (?)	1	–	–	–	–	1
Thais	2	–	1	1	1	5
Trivia	2	–	–	–	–	2
Turritella	20	–	17	1	7	45
UID	**42**	**3**	**–**	**3**	**186**	**234**
Total	**590**	**196**	**125**	**144**	**655**	**1710**
Proyecto Especial de Monte Albán 1992–94 (shell-working area on west side of North Platform)						
Genus	**Broken shell**	**Worked shell**	**Unmodified whole shell**	**Unfinished ornament**	**Finished ornament**	**Total**
Bivalves	**656**	**740**	**1**	**88**	**63**	**1548**
Anadara	1	–	–	–	–	1
Chama	12	–	1	1	–	14
Chama (?)	1	–	–	–	–	1
nacreous/*Pinctada*	592	603	–	67	56	1318
Ostrea	2	–	–	–	–	2
pelecypod UID	8	3	–	–	2	13
Pinctada	7	115	–	9	1	132
Pinctada (?)	30	17	–	11	2	60
Spondylus	1	1	–	–	2	4
Spondylus (?)	2	–	–	–	–	2
Ventricolaria	–	1	–	–	–	1
Gastropods	**35**	**13**	**7**	**5**	**26**	**86**
Acmaea	1	–	–	–	–	1
Agaronia	–	–	–	–	1	1
Astraea	1	–	–	–	–	1
Cerithidea	–	–	1	–	–	1
Cerithium	–	–	–	1	–	1
Conus	–	–	–	–	1	1
Fissurella	–	–	–	–	1	1
gastropod UID	19	11	–	3	4	37
Haliotis	1	–	–	–	–	1
Haliotis (?)	2	–	–	–	–	2
Hexaplex (?)	1	–	–	–	–	1
Latirus	–	–	1	–	–	1
limpet UID	1	–	–	–	–	1
Malea	–	1	–	–	–	1
Malea (?)	1	–	–	–	–	1
Marginella	1	–	–	–	1	2
Mitrella	–	–	–	–	2	2
Mitrella (?)	1	–	–	–	–	1
Morum	–	–	–	–	1	1
Nassarius	–	–	1	–	–	1
Oliva	1	–	–	–	2	3

(*Continued*)

Genus	Broken shell	Worked shell	Unmodified whole shell	Unfinished ornament	Finished ornament	Total
Olivella	–	–	1	–	9	10
Olivella (?)	–	–	–	–	1	1
Patella	–	1	–	–	1	2
Petaloconchus (?)	1	–	–	–	–	1
Pyrene	–	–	–	–	1	1
Strombus	1	–	–	1	–	2
Turritella	3	–	3	–	1	7
UID	**6**	**–**	**–**	**–**	**1**	**7**
Total	**697**	**753**	**8**	**93**	**89**	**1641**
Proyecto Monte Albán 1972–73						
Genus	**Broken shell**	**Worked shell**	**Unmodified whole shell**	**Unfinished ornament**	**Finished ornament**	**Total**
Bivalves	**5**	**5**	**1**	**16**	**36**	**63**
Chama	1	–	–	–	–	1
nacreous/*Pinctada*	2	4	–	6	12	24
Pinctada	–	–	1	5	6	12
Pinctada (?)	–	1	–	5	18	24
Spondylus	1	–	–	–	–	1
Tagelus (?)	1	–	–	–	–	1
Bivalves (freshwater)	**–**	**–**	**1**	**–**	**1**	**2**
Margaritifera (?)	–	–	1	–	1	2
Gastropods	**1**	**1**	**2**	**1**	**10**	**15**
Agaronia	–	–	–	–	1	1
Cypraea	1	–	–	–	–	1
Haliotis	–	1	–	–	–	1
Malea (?)	–	–	–	–	1	1
Mitrella	–	–	–	–	1	1
Oliva	–	–	–	–	2	2
Oliva (?)	–	–	–	1	–	1
Olivella	–	–	–	–	4	4
Patella	–	–	1	–	–	1
Strombus	–	–	–	–	1	1
Turritella	–	–	1	–	–	1
Scaphopods	–	–	–	–	1	1
Dentalium	–	–	–	–	1	1
UID	**–**	**–**	**–**	**1**	**–**	**1**
Total	**6**	**6**	**4**	**18**	**48**	**82**
Proyecto Salvamento Carretera de Acceso a Monte Albán 1991						
Genus	**Broken shell**	**Worked shell**	**Unmodified whole shell**	**Unfinished ornament**	**Finished ornament**	**Total**
Bivalves	**96**	**35**	**14**	**17**	**47**	**209**
Arca	–	–	1	–	–	1
Chama	12	2	4	–	–	18
Chama (?)	1	–	–	–	–	1
Choromytilus (?)	–	–	1	–	–	1
Dosinia (?)	1	–	–	–	–	1
Macoma (?)	–	–	1	–	–	1
nacreous/*Pinctada*	61	15	–	11	31	118
pelecypod UID	4	–	6	1	–	11

Genus	Broken shell	Worked shell	Unmodified whole shell	Unfinished ornament	Finished ornament	Total
Pinctada	9	6	–	4	10	29
Pinctada (?)	3	10	–	1	3	17
Pitar (?)	1	–	–	–	–	1
Polymesoda (?)	–	–	1	–	–	1
Pteria (?)	1	–	–	–	–	1
Spondylus	1	2	–	–	2	5
Spondylus (?)	1	–	–	–	1	2
Tivela	1	–	–	–	–	1
Gastropods	**31**	**11**	**20**	**5**	**60**	**127**
Acmaea	3	–	1	–	1	5
Agaronia (?)	1	–	–	–	–	1
Anachis	–	–	–	–	1	1
Astraea	1	–	1	–	–	2
Cassis	1	–	–	–	–	1
Cassis (?)	–	1	–	–	–	1
Cerithidea	–	–	2	–	–	2
Conus	–	1	–	1	1	3
Cypraea	3	–	–	–	–	3
Distorsio/Bursa/ Cymatium	1	–	–	–	–	1
Ficus	–	–	–	1		1
gastropod UID	8	7	–	1	11	27
Haliotis	1	–	–	1	–	2
Janthina	1	–	–	–	–	1
Lamellaria	–	–	1	–	–	1
Latirus	–	–	1	–	–	1
Marginella	–	–	–	–	13	13
Mitrella	1	–	–	–	3	4
Natica	1	–	–	–	–	1
Nerita	–	–	–	–	2	2
Oliva	4	–	–	–	9	13
Oliva (?)	–	–	–	1	–	1
Olivella	–	–	1	–	15	16
Patella	–	1	–	–	–	1
Strombus (?)	–	1	–	–	–	1
Tegula (?)	–	–	1	–	–	1
Thais	–	–	–	–	4	4
Turritella	5	–	12	–	–	17
UID	**5**	**1**	**2**	**1**	**41**	**50**
Total	**132**	**47**	**36**	**23**	**148**	**386**

FIELDIANA

ANTHROPOLOGY

VOLUME 48

BAR INTERNATIONAL SERIES 3177 | 2024

'This is a significant work, not only as a site report but also as a source of theory-building. (It) will stand as a model for all future studies of household-scale craft economies world-wide.'

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 Archaeological investigations at the prehispanic Ejutla site in Oaxaca, Mexico, have had a foundational role in reframing our perspectives on Mesoamerican economies, specifically craft specialization. This volume reports on the excavations of a residential complex located at the southern limits of the Valley of Oaxaca system, where evidence was recovered for multiple craft activities associated with a single non-elite domestic unit. The residential occupants crafted a variety of ornaments from marine shell, mostly sourced to the Pacific Coast, but few were consumed by the householders themselves. In addition, the Ejutla craftworkers produced a range of ceramic utilitarian vessels, including domestic wares and figurines, as well as small lapidary objects. Many of the craft goods produced were destined for exchange, circulating in both local and longer-distance networks. The findings have laid a basis for new theorizing on prehispanic economic production and the revision of prior notions that presumed principally local economies, in which specialized production for exchange was centered in nondomestic workshops.

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ISBN 978-1-4073-6169-7

9 781407 361697

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